22101939202

Digitized by the Internet Archive
in 2016

https://archive.org/details/b28710216

MANUAL OF DISEASES OF THE

THROAT AND NOSE

A MANUAL OF DISEASES

OF THE

THROAT AND NOSE,

INCLUDING THE

PHARYNX, LARYNX, TRACHEA,
ŒSOPHAGUS, NOSE, AND NASO-PHARYNX.

BY

MORELL MACKENZIE, M.D. LOND.

CONSULTING PHYSICIAN TO THE HOSPITAL FOR DISEASES OF THE THROAT,
LECTURER ON DISEASES OF THE THROAT AT THE LONDON HOSPITAL MEDICAL COLLEGE,
AND CORRESPONDING MEMBER OF
THE IMPERIAL ROYAL SOCIETY OF PHYSICIANS OF VIENNA.

ARMY MEDICAL STAFF LIBRARY
2d March 1885
NETLEY

VOL. II.—DISEASES OF THE ŒSOPHAGUS, NOSE, AND NASO-PHARYNX.

LONDON:
J. & A. CHURCHILL, NEW BURLINGTON STREET.
1884.

[*All rights reserved.*]

PREFACE.

It is now nearly twelve years since this work was commenced, and during that period there is scarcely a page that has not been written and re-written many times. This slow rate of progress has been due partly to the inevitable delay caused by the many other demands on my time, and in part also to the rapid development of a new specialty involving frequent modification of views, and bringing constant additions to the literature of the subject.

No one can be more keenly aware than myself how great a gulf is fixed between the conception and the actual execution of my design, and in a book of such extent numerous errors must, in spite of the utmost vigilance, have escaped my notice. I confess that had I foreseen how much time and trouble the work, imperfect as it is, would have cost me, I should never have had the courage to undertake it. Even now I am unable to issue the volume in its integrity as originally planned, the section of Diseases of the Nose and Naso-Pharynx having grown under my hands to such dimensions that it has been found impossible to include Diseases of the Neck. I hope, however, that this division, the greater part of which is already in print, will shortly appear in a separate form as one of my series of "Essays on Throat Diseases."

I have once more to express my thanks to several friends and assistants who have aided me in clinical investigations and literary researches, and in particular I must acknowledge my deep obligations to Mr. C. L. Taylor for his invaluable help during the last four years. Mr. Mark Hovell has again been good enough to prepare an index to the book, and the careful way in which he has performed this most useful task cannot fail to be gratefully appreciated by those who have occasion to refer to these pages.

Dr. Felix Semon's translation will be published simultaneously with the original, and it is, naturally, a source of much gratification to me that my labours should be made known to my fellow-workers in Germany by so thoroughly able an exponent.

M. M.

19, Harley Street, Cavendish Square.
April,[1] 1884.

---

[1] The appearance of the book has been delayed for several months in consequence of the entire edition having been destroyed, on the very eve of publication, by a disastrous fire which consumed the premises of the printers, Messrs. Pardon. The reprinting has been carried out with all possible rapidity from proof-sheets in my possession. I think it necessary to make this statement in order to explain how it is that several valuable writings, published within the last few months, are unnoticed in the present volume.

CONTENTS.

SECTION IV.—THE GULLET.

PAGE

Anatomy of the Gullet; Examination of the Gullet; Œsophageal Instruments; Diseases of the Gullet; Acute Œsophagitis; Œsophagitis in Infants; Phlegmonous Œsophagitis; Ulcer of the Gullet; Traumatic Œsophagitis; Chronic Œsophagitis; Varicose Veins of the Gullet; Peri-Œsophageal Abscess; Thrush of the Gullet; Diphtheria of the Gullet; Malignant Tumours of the Gullet; Cancer of the Gullet; Sarcomata; Non-Malignant Tumours of the Gullet; Syphilis of the Gullet; Tubercular Disease of the Gullet; Dilatations of the Gullet; Simple Dilatations; Sacciform Dilatations; Traction-Diverticula; Cicatricial Stricture of the Gullet; Simple Stenosis of the Gullet; Compression of the Gullet; Rupture of the Gullet; Wounds of the Gullet; Foreign Bodies in the Gullet; External Œsophagotomy; Neuroses of the Gullet; Paralysis of the Gullet; Spasm of the Œsophagus; Malformations of the Gullet; Post-mortem Softening of the Gullet 1

SECTION V.—THE NOSE.

Anatomy of the Nasal Fossæ; Rhinoscopy; Anterior Rhinoscopy; Median Rhinoscopy; Posterior Rhinoscopy; Posterior Rhinoscopy by Double Reflection; Nasal Instruments; Acute Nasal Catarrh; Acute Coryza in Infants; Purulent Nasal Catarrh; Traumatic Rhinitis; Hay Fever; Chronic Nasal Catarrh; Hypertrophy of the Mucous Membrane of the Nose; Dry Catarrh often leading to Ozæna; Chronic Blennorrhœa of the Nose and Air-Passages; Bleeding from the Nose; Non-Malignant Tumours of the Nose; Polypus of the Nose; Fibrous Polypi of the Nose; Papillomata of the Nose; Erectile Tumour of the Pituitary Membrane; Enchondro-

PAGE

mata of the Nose; Osteomata of the Nose; Exostoses of the Nose; Malignant Tumours of the Nose; Syphilitic Affections of the Nose; Hereditary Syphilis of the Nose; Tubercular Disease of the Pituitary Membrane; Lupus of the Pituitary Membrane; Rhinoscleroma; Glanders; Affections of the Nose in Eruptive Fevers and other Acute Diseases; Fractures of the Nose; Dislocation of the Nasal Bones; Deviation of the Nasal Septum; Blood-Tumours of the Nasal Septum; Abscess of the Nasal Septum; Foreign Bodies in the Nose; Rhinoliths; Maggots in the Nose; Entomozoaria in the Nose; Anosmia; Parosmia; Disease of the Fifth Nerve, or its Nasal Branches; Congenital Deformities of the Nose; Synechiæ of the Nasal Fossæ . . 232

SECTION VI.—DISEASES OF THE NASO-PHARYNX.

Chronic Catarrh of the Naso-Pharynx; Dry Catarrh of the Naso-Pharynx; Adenoid Vegetations of the Naso-Pharynx; Fibrous Polypi of the Naso-Pharynx; Fibro-Mucous Polypi of the Naso-Pharynx; Enchondroma of the Naso-Pharynx; Malignant Tumours of the Naso-Pharynx; Throat-Deafness 482

APPENDIX.

Special Formulæ for Topical Remedies; Buginaria; Collunaria—Nasal Douches; Lotiones—Nasal Washes; Nebulæ—Nasal Sprays; Gossypia Medicata—Medicated Cotton-Wools; Olfactoria—Olfactories; Pastils; Insufflationes; Snuffs . 545

A MANUAL OF

DISEASES OF THE THROAT AND NOSE.

VOL. II.

SECTION IV.—THE GULLET.

ANATOMY OF THE GULLET.

THE gullet or œsophagus is that portion of the alimentary canal which connects the pharynx and the stomach. It commences at the *lower border*[1] of the cricoid cartilage on a level with the inferior margin of the body of the fifth cervical vertebra, and passing downwards behind the trachea in an almost vertical direction, traverses the lower part of the cervical region and the whole of the thorax, and after piercing the diaphragm opposite the ninth dorsal vertebra, terminates in the stomach opposite the tenth (ninth dorsal spine).[2]

---

[1] The distinction between the pharynx and the gullet is, of course, purely arbitrary. Most anatomists consider that the œsophagus commences on a level with the lower border of the cricoid cartilage, but Quain (" Elements of Anatomy," vol. ii. p. 821) makes the cricoid cartilage generally, without specifying any border, the limit of the upper extremity of the œsophagus. Mouton (" Du Calibre de l'Œsophage," Paris, 1874), in his laborious measurements of the gullet, does not clearly define its upper limit, but he appears to take an imaginary transverse line running across the middle of the posterior plate of the cricoid cartilage as the point of origin of the œsophagus. It would, however, be much more convenient to make the *upper* border of the cricoid cartilage the boundary line between the two sections of the food-tract. The sudden diminution in the calibre of the canal at this point makes, as it were, a natural division. At present, however, the lower border of the cricoid cartilage is so much more commonly accepted as the level at which the gullet commences, that I have thought it better to adhere to it. From the fact, however, that the cricoid cartilage moves up or down, according to the position of the head, some anatomists object to taking any portion of it as the upper limit of the œsophagus. Middeldorpf (" De polypis œsophagi," Vratislaviæ, 1857, p. 2), indeed, goes so far as to say that the extent of movement amounts to four centimetres when the head is thrown far back. This circumstance has led some writers to make one of the vertebræ the limit marking the upper extremity of the gullet, but the difficulty of recognizing the exact position of the cervical vertebræ during life more than neutralizes any advantage gained by this means.

[2] It may be useful to note that as the spinous processes in the *dorsal region* are directed downwards, the spine of one vertebra corresponds with the body of that immediately below. There is often some difficulty in counting the spinous processes, especially in the early stages of disease when there is but little emaciation, and it may therefore be well to remember that the œsophagus commences about an inch above the *vertebra prominens*, and terminates a little below the level of the inferior angle of the scapula.

The œsophagus is often described as following the antero-posterior curves of the spinal column in its descent. This is true in the cervical region, but the backward curve which is usually described as occurring in the dorsal region does not exist in the erect position of the body. In the upper part of its course the gullet is in the median line, but as it descends it curves slightly to the left until it reaches the root of the neck ; at this point it inclines again towards the middle of the spinal column, which position it reaches opposite the fourth or fifth dorsal vertebra. Immediately before traversing the diaphragm it makes a short curve forwards and slightly to the left. Owing to the very loose attachments of the œsophagus, the relations of the tube are apt to vary to some extent, its position being dependent on slight variations of the adjacent organs, scarcely amounting to abnormalities.

The length of the œsophagus varies according to the stature of the individual, but in an adult male it generally measures from about twenty-four to twenty-six centimetres. The diameter of the tube varies at different levels, and, according to Sappey, it diminishes insensibly "from its upper extremity to the fourth dorsal vertebra, and increases again from that point in an almost insensible manner to its termination. It is therefore composed of two truncated cones united at the apex."[1]

Braune's sections[2] support this description in the main, but the measurements of the diameter of the gullet made by Mouton[3] from plaster of Paris casts give quite different results :—

Superior orifice of the œsophagus	14	millimetres.
At 1 centimetre below superior orifice	19	,,
,, 3½ ,, ,, ...	15	,,
,, 4 ,, ,, ...	15	,,
At rather less than 7 centimetres from superior orifice	14	,,
At 11 centimetres from superior orifice ...	20	,,
,, 14 ,, ,, ...	17	,,
,, 15 ,, ,, ...	21	,,
,, 17 ,, ,, ...	20	,,
,, 21 ,, ,, ...	12	,,
,, 22 ,, ,, ...	12	,,
,, 25 ,, ,, ...	12	,,
,, 25½ ,, ,, ...	14	,,

With the view of determining still more accurately the calibre of the gullet in its whole extent, I performed some experiments suggested by that of Mouton, but more elaborate and on more than one subject. The following were the methods adopted. In the first case the body was securely fixed, with the head downwards, upon a board placed perpendicularly on the ground. The mouth and pharynx were then tightly stuffed with tow so as to close the upper outlet of the food-tract, the stomach laid open, a ligature passed loosely round the cardiac opening, and the ends held outside the wound so that they could be tightened at once when required. The nozzle of a large anatomical syringe, previously charged with a mixture of plaster and water of about the consistence of cream, was next introduced into the lower orifice of the gullet, and the contents were injected with as little force as possible into the canal. When a sufficient quantity of the material had been used, the ligature was tightened round the cardiac aperture of the stomach, and the body was left undisturbed for nearly eighteen hours so as to allow full time for the plaster to set firmly. On the next day the whole length of the gullet thus injected was removed from the body by a dissection conducted with the utmost care so as to avoid the least injury to the cast. The œsophageal wall was then carefully divided by a vertical incision carried along its whole length, when an accurate cast of the gullet was found to have been obtained.

---

[1] "Traité d'Anatomie Descriptive," t. iv. p. 150. 3me édition, Paris, 1879.

[2] "Atlas of Topographical Anatomy," translated by E. Bellamy. London, 1877. See plates vii. viii. ix. x. and xi.

[3] "Du Calibre de l'Œsophage." Paris, 1874, p. 17.

Subject I.

A large-framed, muscular man, 6 ft. in height. The injection was made at the London Hospital in the early part of January, 1881. The length of the œsophagus was 27 centimetres. The other measurements were as follows:—

Point of Measurement.	Transverse Diameter.	Antero-Posterior Diameter.
Lower edge of cricoid.	25 millim.	14 millim.
1 centim. below ,,	25 ,,	14 ,,
2 ,, ,,	23 ,,	18 ,,
3 ,, ,,	23 ,,	19 ,,
4 ,, ,,	24 ,,	17 ,,
5 ,, ,,	24 ,,	18 ,,
6 ,, ,,	21 ,,	19 ,,
7 ,, ,,	22 ,,	18 ,,
8 ,, ,,	22 ,,	18 ,,
9 ,, ,,	23 ,,	19 ,,
10 ,, ,,	24 ,,	18 ,,
11 ,, ,,	24 ,,	18 ,,
12 ,, ,,	24 ,,	20 ,,
13 ,, ,,	26 ,,	21 ,,
14 ,, ,,	27 ,,	23 ,,
15 ,, ,,	26 ,,	23 ,,
16 ,, ,,	27 ,,	22 ,,
17 ,, ,,	25 ,,	21 ,,
18 ,, ,,	24 ,,	20 ,,
19 ,, ,,	23 ,,	20 ,,
20 ,, ,,	25 ,,	20 ,,
21 ,, ,,	24 ,,	21 ,,
22 ,, ,,	24 ,,	23 ,,
23 ,, ,,	24 ,,	23 ,,
24 ,, ,,	27 ,,	22 ,,
25 ,, ,,	29 ,,	21 ,,
26 ,, ,,	31 ,,	22 ,,
27 ,, ,, .	31 ,,	25 ,,

Although the subject experimented on was a large man, the dimensions of the œsophagus at different levels were so much greater than those given by Mouton that I thought it possible some artificial distension had been effected by a too forcible injection with the syringe. In the second case, therefore, the liquid plaster was poured down the gullet from the stomach with the aid of a filler.

SUBJECT II.

A man, 5 ft. 4 in. in height. The œsophagus was injected with plaster of Paris on January 21st, 1881, in the mortuary of the London Hospital. Death had taken place three days before, but the weather was very cold, and *rigor mortis* had not quite passed away. The length of the œsophagus was 25½ centimetres. The following were the other measurements :—

Point of Measurement.	Transverse Diameter.	Antero-Posterior Diameter.
Lower edge of cricoid.	21 millim.	10 millim.
1 centim. below ,,	19 ,,	15 ,,
2 ,, ,,	22 ,,	15 ,,
3 ,, ,,	22 ,,	14 ,,
4 ,, ,,	19 ,,	13 ,,
5 ,, ,,	18 ,,	15 ,,
6 ,, ,,	18 ,,	15 ,,
7 ,, ,,	19 ,,	13 ,,
8 ,, ,,	18 ,,	12 ,,
9 ,, ,,	19 ,,	14 ,,
10 ,, ,,	21 ,,	10 ,,
11 ,, ,,	23 ,,	11 ,,
12 ,, ,,	22 ,,	13 ,,
13 ,, ,,	23 ,,	17 ,,
14 ,, ,,	23 ,,	17 ,,
15 ,, ,,	25 ,,	17 ,,
16 ,, ,,	25 ,,	15 ,,
17 ,, ,,	24 ,,	18 ,,
18 ,, ,,	22 ,,	15 ,,
19 ,, ,,	21 ,,	14 ,,
20 ,, ,,	19 ,,	13 ,,
21 ,, ,,	16 ,,	11 ,,
22 ,, ,,	16 ,,	12 ,,
23 ,, ,,	17 ,,	12 ,,

In the second experiment the measurements are much smaller than the first, but the body was not nearly so large. Even in this instance, however, the standard of size is throughout very much greater than in Mouton's subject. The practical outcome of my experiments[1] is to show that the transverse diameter of the gullet is very considerably greater than the antero-posterior measurement.

When not distended in the act of swallowing, the mucosa, which is only very loosely connected with the submucous areolar tissue, is thrown into longitudinal folds, which project into the lumen of the canal, and at certain points fill it up altogether. It is only near its origin, however, and at about seven centimetres lower down, that this juxtaposition of the internal walls of the œsophagus closes the canal ; at other levels it is probably always partially patent. As is shown by my experiments, the œsophagus is symmetrically flattened between the trachea and bodies of the vertebræ in the antero-posterior direction in the neck : and lower down, though its canal occasionally approximates to a circular form, it generally retains a kidney-shaped lumen.

---

[1] It would be highly desirable that these experiments should be repeated on an extensive scale.

In its cervical and thoracic portions the gullet comes into relation with important adjacent structures, which must be borne in mind in the diagnosis and treatment of its diseases. In its brief abdominal course its relations are of minor practical interest.

In the cervical region the gullet is in relation, *anteriorly*, with the membranous portion of the trachea, to which it is bound by loose areolar tissue. *Posteriorly*, it is separated from the vertebral column by the longi colli muscles. *Laterally*, it is in relation with the thyroid gland, especially its left lobe, with the common carotid arteries, and, more externally, with the pneumogastric nerves and internal jugular veins. In the angle between the trachea and œsophagus lie the two recurrent laryngeal nerves. Owing to its curve to the left, the œsophagus comes into more intimate relations with the left carotid artery than with the right, and for the same reason the left recurrent nerve is, at the root of the neck, almost in front of the tube.

In the thorax, the œsophagus is contained in the posterior mediastinum; it is in relation, *anteriorly*, from above downwards with the following parts: viz., the trachea, the left carotid and subclavian arteries (near their origin from the left side of the transverse portion of the arch of the aorta), the bifurcation of the trachea (opposite the third dorsal vertebra), the left bronchus (which crosses it obliquely), the bronchial glands; below this the posterior surface of the commencement of the arch of the aorta, and the posterior surface of the left auricle, or rather the corresponding part of the pericardium, are in near relation to the gullet. *Posteriorly*, the œsophagus is at first in close contact with the spine and longi colli muscles, but in its descent it becomes separated from these by loose connective tissue, by the right intercostal arteries, the vena azygos, and the thoracic duct as it passes obliquely upwards from right to left. Just before the gullet leaves the thorax and on a level with the eighth dorsal vertebra, it comes into relation, posteriorly, with the descending aorta, the opening for which in the diaphragm is almost immediately behind that for the œsophagus. *Laterally*, the thoracic portion of the œsophagus is in contact with the pleuræ, with the vena azygos major on the right side, and on the left with the descending aorta. The pneumogastric nerves lie at first one on either side of the tube, but in their descent they pass, the left in front of it, and the right behind it.

The abdominal portion of the œsophagus is of very minor importance; it is covered by the peritoneum both anteriorly and posteriorly.

Like the rest of the alimentary tube, the œsophagus consists of three coats—mucous, submucous, and muscular. The mucous layer is of moderate thickness, and is mainly composed of loose connective tissue, which contains a large proportion of loose elastic fibres. Its surface is closely studded with delicate papillæ, which, together with the intervening depressions, are covered by a laminated pavement-epithelium. Between the mucous and submucous coats is a layer of plain muscular fibres, the muscularis mucosæ, which is imperfect in the upper part of the tube, but attains a considerable development inferiorly, where it forms a continuous investment, arranged in longitudinal folds. The submucous connective tissue is considerably thicker than the mucous coat, and so loosely attached to it as to allow very free movement of the latter, and to admit of its being arranged in longitudinal folds when the tube is in its natural state of contraction.

The constituent bundles of the submucous, like those of the mucous coat, include a considerable number of elastic fibres, and form a stratum supporting the vessels and nerves. The muscular coat is composed of two layers of fibres, a circular or internal, and a longitudinal or external. The latter is the thicker, especially at the commencement of the tube, but it diminishes in thickness as it descends. It consists of three divisions—an anterior and two lateral. The former, which is by far the strongest of the three, is attached above to the ridge on the posterior surface of the cricoid cartilage by means of a triangular elastic ligament, while the lateral portions take origin from the elastic expansion of the palato-pharyngei muscles. In its course downwards the longitudinal layer often derives a small muscular slip from the left bronchus—the broncho-œsophageus muscle, while similar additions to the circular layer are described as being occasionally obtained from the left lateral wall of the posterior mediastinum. The muscular coat of the œsophagus consists, in its upper fourth, mainly of striated fibres; in its second fourth, of about equal proportions of voluntary and involuntary muscle; while in the remainder of its course it is constituted almost entirely of unstriped fibres. The muscular coat is attached to the adjacent structures by a loose areolar investment, which contains a large proportion of elastic fibres.

The œsophagus contains a considerable number of mucous glands of the acinous, racemose, and compound tubular varieties.

These glands are lined with cylindrical epithelium, and are for the most part imbedded in the submucous connective tissue. They are less abundant in the human gullet than in that of many of the lower animals, and occur in greater numbers at the lower than the upper part of the tube. The vascular supply of the œsophagus is derived mainly from the thoracic aorta, inferior thyroid artery, and coronary branch of the cœliac axis; the vessels have mostly a longitudinal direction, and anastomose freely with one another. At the lower part of the œsophagus, the veins communicate pretty freely with the coronary veins of the stomach, and are thus brought into relation with the portal system.

The lymphatics differ in their arrangement from those in other parts of the alimentary canal by forming only one layer, which is placed internal to the muscular coat. They communicate with neighbouring glands, and near the root of the lungs terminate in the thoracic duct after having anastomosed with the pulmonary lymphatics.

The nerves are derived from the pneumogastric, recurrent laryngeal, and sympathetic, offshoots from which join each other in a complicated network (plexus gulæ), which encircles the œsophagus, lying for the most part between the longitudinal and circular layers of its muscular coat.

EXAMINATION OF THE GULLET.

The gullet can be examined during life by auscultation, by sounding, and by direct inspection with the œsophagoscope. Palpation also should not be neglected, for although the œsophagus itself cannot be felt, useful information may sometimes be obtained as to the condition of the neighbouring parts. Thus deep-seated abscess of the neck, enlargement of the glands, fibroid thickening of the thyroid body, or the pulsation of an aneurism may be detected, whilst the negative evidence afforded by the absence of swelling or tenderness in the cervical region may in certain cases be important.

Auscultation of the Œsophagus.—This consists in listening either through the stethoscope or directly with the ear over the course of the gullet, whilst the patient swallows some fluid. The proposal of this method of examination is entirely due to Hamburger, and the short articles since published by myself,[1] Elsberg,[2] and Clifford Allbutt[3] are little more than epitomes of Hamburger's[4] essay. Œsophageal auscultation is easily carried out, but it requires considerable practice and much patience: practice, because it is requisite to get the ear well accustomed to the normal œsophageal sounds; patience, because in each case it is necessary to apply the stethoscope successively down the whole length of the œsophagus, and to listen attentively at each spot. Before attempting to apply the method in disease it is essential to become acquainted with the normal sounds produced in deglutition; and for this purpose repeated examinations should be made on healthy persons. The following is the best way of practising the art. The individual to be examined should be directed to take a mouthful of drink—water does very well for the purpose, but a thickened fluid, such as gruel or arrowroot, answers better. The stethoscope is then applied over some portion of the food-tract, the person is directed to swallow, and the sound produced in the act of deglutition carefully listened to. As the small portion of fluid, or, as it has been somewhat arbitrarily called, "the morsel," passes down the throat it produces various sounds, and conveys certain impressions to the mind of the listener. The proper interpretation of these sounds constitutes the art of œsophageal auscultation. If the stethoscope be applied to the side of the neck, on a level with the hyoid bone, and the person be directed to swallow a morsel, a loud, gurgling noise is heard, which may be called the "pharyngeal sound." The word "glouglou" has been said to represent the pharyngeal sound; but in order to get an idea of it, "glouglou" should be

---

[1] "Lancet," May 30, 1874.

[2] "Auscultation of the Œsophagus." Philadelphia, 1875.

[3] "British Med. Journ." 1875, vol. ii. p. 420.

[4] "Klinik der Œsophaguskrankheiten," Erlangen, 1871. Hamburger's views, however, had been developed previously in a series of papers in the "Œsterreich. Med. Jahrb.," 1867, 1868, 1869.

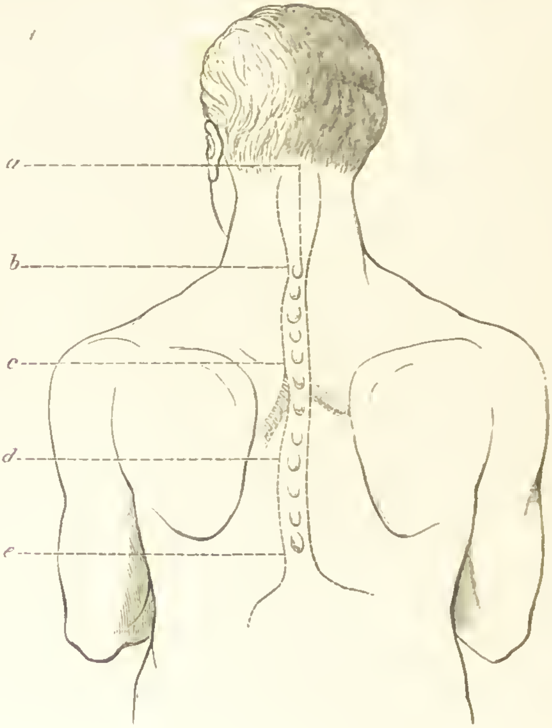

Fig. 1.—Diagram showing the Situation and Curves of the Œsophagus and its Relation to the Spinous Processes, Scapulæ, and Bifurcation of the Trachea.

a, inferior curved line of occipital bone about five-eighths of an inch below the occipital protuberance, indicating the commencement of the pharynx; *b*, fifth cervical vertebra, at which spot the œsophagus commences (this spinous process can be easily recognized from its relative position to the vertebra prominens, usually the seventh); *c*, second dorsal vertebra; *d*, sixth dorsal spine; *e*, ninth dorsal spine. The upper third of the gullet therefore corresponds to the distance between *b* and *c*, the middle third to the distance between *c* and *d*, and the lower third to the distance between *d* and *e*. The position of the bifurcation of the bronchi from the trachea is seen to be in the middle third.

pronounced in a loud whisper; and it must be admitted that in many healthy persons the sound does not bear much resemblance to this word. If instead of listening in the neck, the stethoscope be applied to the left side of one of the dorsal vertebræ, the true "œsophageal sound" becomes audible. The pharyngeal sound, which is due to the sudden passage of air and liquid into the pharyngeal cavity, is sometimes so loud, and so distinctly conveyed down the œsophagus, that it obscures the true œsophageal sound. In these cases it is better to let the patient take a continuous draught of water, as by this means the intermingling of air and water is greatly diminished, and the true œsophageal sound may often be detected. The sound which is heard conveys the idea of the rapid passing downwards of a "small spindle-shaped body of fluid consistence." The sound is sharp and sudden, and ceases abruptly. Hamburger describes it as being suggestive of an egg-shaped body, about an inch in length, and half an inch in breadth, the small end of the egg being above and the large end below. He is also of opinion that the shape of the morsel affords a strong indication as to the condition of the muscular walls of the œsophagus, the lower end of the morsel or egg-shaped body being blunted or truncated in proportion to the feebleness of the muscular action. These, however, are refinements which it is difficult to arrive at.

The principal points which have to be considered are—first, the character of the œsophageal sound; and, secondly, the quickness of the act of deglutition. In some cases the sound is very feeble, and occasionally altogether absent; sometimes, and this is often the case in organic strictures, a confused and continuous bubbling noise is heard, which lasts for several seconds; sometimes a grating sound may be perceived at the same time. The quickness of the act of deglutition is also of some importance, and can be determined by placing the hand on the hyoid bone whilst the stethoscope is applied over the œsophagus posteriorly; as the patient commences to swallow, the operator feels the hyoid bone rise, and can thus estimate the length of time which elapses before the morsel reaches that portion of the œsophagus which is being auscultated. The rapidity of the act varies in different people in a state of health, and it can always be made to take place quite slowly. This will be at once apparent on directing a healthy man to continue for a few minutes swallowing some rather difficult substance, such as a mealy potato. Under ordinary circumstances the lapse of time between the entrance of the morsel into the gullet and its arrival opposite the stethoscope placed at the side of the eighth dorsal vertebra is so short that it cannot be determined; but after swallowing several mouthfuls of potato without drink, two or three seconds elapse before the morsel arrives at the lower part of the œsophagus.

Regurgitation can also be perceived when from any cause the food cannot descend into the stomach. The mode in which this takes place sometimes enables us to distinguish between a spasmodic and an organic stricture; for whilst in the latter case an appreciable time elapses before the food is forced upwards, in spasmodic stricture the regurgitation is instantaneous. According to Hamburger, when the œsophagus is pressed upon by a tumour in the posterior mediastinum, the sound may be heard more distinctly on the right side of the vertebræ than on the left.

Sounding.—This method of exploration is carried out with the aid of *bougies*, and is employed for the purpose of determining the calibre of the gullet. It should be borne in mind, however, that much harm is often done by the introduction of these instruments. They should, therefore, never be used unless other means of investigation fail to give the desired information. Two kinds of bougies are employed under different circumstances, viz., those made of gum-elastic, and those in which there is a slender whalebone stem, terminating in an olive-shaped ivory knob. Ordinary gum-elastic bougies are cylindrical[1] in form throughout the greater part of their length, but the distal end is more or less conical. From the experiments, however, already detailed (pages 3 and 4), as well as from the appearance in frozen sections,[2] it is clear that the sectional outline of the gullet is oval or kidney-shaped, the diameter from side to side being greater than from before backwards. I have, therefore, arrived at the conclusion that bougies somewhat flattened antero-posteriorly would most easily adapt themselves to the lumen of the tube through which they are meant to be passed, and this view has been confirmed by experience. Thirteen sizes are made, the measure of each one being based on the number of millimetres in the transverse, *i.e.*, their long diameter. The sizes are reckoned from No. 3 to No. 15. Thus, No. 3 measures three millimetres from side to side, No. 4 four millimetres, and so on throughout the scale. Nos. 1 and 2 are not made, as they are too small to be of any use.

---

[1] In some cases, however, tapering and the so-called "radish-shaped" instruments may be useful. The tapering bougie is small at the distal end, and gradually increases in size for about three or four inches till the maximum diameter is attained: and the radish-shaped instrument is slender at its further extremity, then becomes somewhat suddenly greatly enlarged, again returning to the smaller dimensions.

[2] Braune: Op. cit. pl. vii. viii. ix. x. and xi.

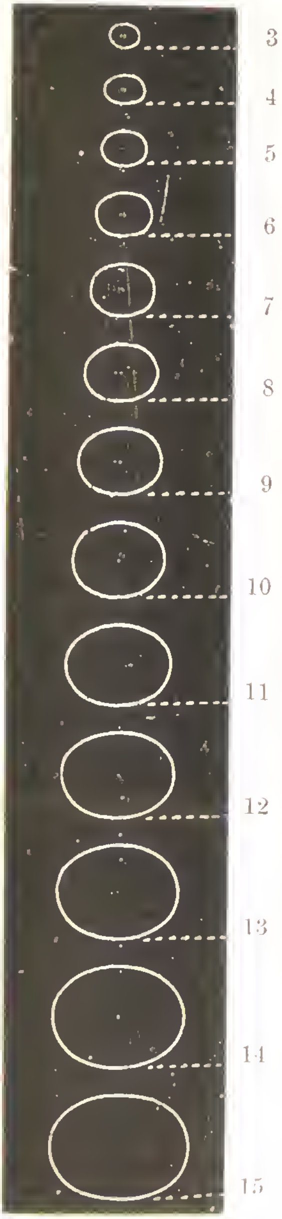

Fig. 2.—The Author's Scale for Œsophageal Bougies.

The ivory-knobbed bougies are sometimes useful when the obstruction is of a spasmodic character, the spasm occasionally yielding to a knob whilst resisting a cylindrical body. The knob at the end of the whalebone stem resembles an olive in shape, the small end being directed downwards. The same whalebone rod can be used for several knobs of various sizes, as they are made to unscrew. These instruments have not hitherto been made according to any scale, and I very seldom use them on account of the risk there always is of the ivory knob becoming separated from the stem. Although in the ordinary course the little point would pass into the stomach and do no harm, there is some danger of its being vomited or hawked upwards, and finding its way into the air-passages. It is obvious that the danger is much increased where there is a stricture of the gullet, as under such circumstances the knob cannot pass downwards, and it will most likely be thrown violently upwards by sudden spasm of the muscular walls of the œsophagus.

When a gum-elastic bougie has to be passed it should be warmed and then dipped into water or glycerine (not oil, as that is often very disagreeable to the patient), and then slightly bent at about an inch from its extremity, so that when introduced into the throat the point of the bougie presses slightly by its own elasticity against the posterior wall of the pharynx, and is thus unlikely to enter the larynx. The patient should sit with his neck stretched out and his head thrown slightly back, whilst the operator standing in front depresses the tongue with the forefinger of his left hand, and directs the point of the instrument downwards in a slanting direction against the middle of the posterior wall of the pharynx at its lowest part. In introducing the bougie about four inches of its length should extend beyond the hand, and it should be pushed slowly and gently down the throat. When the instrument is judged to have entered the œsophagus, it is a good plan to tell the patient to bend his head a little forwards, and to perform the act of swallowing. Should any obstruction to its course be encountered, the instrument should be withdrawn and again carefully passed into the gullet.

If it be again arrested at the same point and the employment of *very gentle pressure* and manipulation fail to pass it beyond the obstacle it should be altogether withdrawn, and a bougie several sizes smaller introduced. Proceeding in the same manner and with like precaution, the operator should, if the attempt does not cause any great discomfort or irritation, try a third or fourth instrument, as the case may be, until he either penetrates the stricture or concludes that it is impermeable. Should the bougie be found to pass beyond the point at which the first instrument was arrested, it should be pushed steadily downwards until it reaches the stomach, whilst the character of the surface over which it glides, the direction in which it goes, the distance traversed, and the contractile power of the œsophagus at different levels should be carefully noted. It is necessary to take the precaution of passing the instrument quite down to the stomach, as there sometimes exists a second stricture below the first. On withdrawing the bougie the distance from the patient's teeth to its extremity should always be measured. It should be remembered, however, that the distance from the incisor teeth to the orifice of the œsophagus varies from 15½ to 17 centimetres, and in estimating the situation of an obstruction this length must be always deducted from the length of the bougie passed into the body. If a good-sized bougie can be passed without encountering any obstacle, a larger one may be employed at the next visit if any symptoms of obstruction continue. If, however, a No. 15 (see scale, p. 11) can be passed through the whole length of the canal it may be concluded that there is no mechanical obstruction—*i.e.*, no organic stricture. An instrument has been invented by Dr. Gaston Sainte-Marie,[1] by means of which it is proposed to measure the calibre of the gullet throughout its entire extent, or at any given point. It consists of a hollow sound, at the lower end of which is a small olive-shaped bag made of india-rubber, so that its capacity is diminished by very slight pressure. Into the upper extremity of the sound is fitted a graduated glass tube, about ten centimetres long, provided at its upper part with a stopcock and a metallic funnel. By this means water, or some coloured liquid, can be poured into the instrument, thus distending the bag at the other end to the fullest extent. It is obvious that any pressure on the walls of the bag will cause the fluid to rise above its original level in the glass tube, and the greater the pressure the higher will the contained fluid be forced. I am not aware that this instrument has ever been tried in actual practice, and it is evident that it would be difficult to use in such a way as to obtain any trustworthy results.

Œsophagoscopy.—This method consists in the visual examination of the interior of the gullet by means of suitable instruments. These must necessarily be in the form of tubes, and their use is always likely to be attended with considerable difficulty; for, unlike the larynx and trachea, which are nearly always open to inspection, the orifice of the gullet is closed, and lower down the walls of the canal are usually in more or less close apposition. Further difficulty arises from the spasmodic contraction, so easily set up, of the muscular tunic of the œsophagus, and also from the pharyngeal irritation which almost unavoidably occurs in introducing instruments.

The older surgeons do not appear to have endeavoured to overcome these difficulties, and the first attempt to examine the gullet during life would seem to have been made by Semeleder and Stoerk in 1866.[2] This experiment, however, yielded only negative results. The instrument employed appears to have consisted of a forceps with spoon-shaped blades. The idea of the instrument originated with Semeleder, who offered himself to Stoerk for experiment. After the introduction of the instrument, the laryngeal mirror was placed in the ordinary position, but it was at once found that the view was obstructed by a kind of figure-of-eight projection of the mucous membrane between each blade of the forceps.[1]

---

[1] "Des différents modes d'exploration de l'Œsophage." Paris, 1875, p. 21.

[2] Private letter from Professor Stoerk, November 13, 1880. Dr. Stoerk has since published an account of this experiment in the article in which his more recent invention is described ("Wien. klin. Wochenschrift," No. 8, February, 1881).

Two years afterwards the late Dr. Waldenburg[2] invented an œsophagoscope. This instrument was a gum-elastic tube, eight centimetres in length. It was slightly conical in shape, the diameter above being one centimetre and a half, and below, one centimetre. It was connected to the extremity of a two-pronged-fork, fourteen centimetres in length, in such a way that considerable movement was permitted between the fork and the tube. After the introduction of the instrument it was held with the left hand, and the tongue being slightly pressed down, the laryngeal mirror was put into the mouth. In the case in which Dr. Waldenburg used the instrument there was a pouch at the upper part of the gullet on the left side, and he was able to keep the instrument *in situ* for ten or fifteen seconds, and to see that the mucous membrane of the œsophagus was not ulcerated or in any way diseased. On introducing the speculum into the diverticulum itself, that cavity was seen to contain a small quantity of food. Afterwards Waldenburg had an instrument constructed of metal instead of gum-elastic, consisting of two tubes arranged telescopically, each tube being six centimetres in length, one playing on the other by means of a slot. Waldenburg's instrument was exhibited and used on a patient by Professor Stoerk, before the Society of Physicians of Vienna.[1]

---

[1] In 1868, Bevan ("Lancet," vol. i. April, 1868) published a description of various instruments for examining the pharynx, larynx, and posterior nares, fitted to a lamp, on the principle of the endoscope. In this paper there is no detailed description of the œsophagoscope, but merely a few lines describing the figure which illustrates it. As far as I can make out from this drawing, the œsophagoscope appears to be a straight tube, four inches long by three-quarters of an inch in diameter, which has attached to its upper extremity, by means of a wire on each side, a ring slightly larger in diameter and about one inch in length. This ring is placed at an angle of about forty-five degrees to the tube, and to it the pharyngoscopic tube of the endoscope was, to use the words of the inventor, "very easily applied." It is not stated that any mirror was used, but as a reflector is seen in the drawing of the pharyngoscope it was probably employed for inspecting the gullet. A perusal of Bevan's paper will convince any reader that the experiments were the results of work in the library rather than in the wards of a hospital; and, in fact, that the instrument is of no practical value.

[2] "Berlin. klin. Wochenschrift," No. 48, November 28, 1870.

Subsequently Stoerk employed an instrument resembling Waldenburg's, but consisting of three tubes. In February, 1881, Professor Stoerk[2] described a new œsophagoscope, which consists of a lobster-jointed tube, covered with india-rubber, with a small mirror attached to its upper extremity, and with a handle, consisting of a two-pronged fork like that of Waldenburg. This tube is provided with a pilot, or director, consisting of a piece of elastic tubing, terminating in a small bag which projects beyond the end of the œsophagoscope, the diameter of the bag being a little larger than that of the tube. The ball being inflated, the instrument is passed into the gullet, when the air is allowed to escape, and the pilot withdrawn.

My own attempts to examine the gullet with an œsophagoscope were first made in February, 1880. From the following description it will be seen that the instrument which I have introduced[3] is altogether different from those hitherto employed. It consists of two parts—a stem and a skeleton tube. The stem is made up of a handle and a shank, between which there is a hinge. The skeleton tube is only formed when the instrument has been introduced into the gullet; before that, it consists of two flattened wires placed anteriorly and posteriorly, connected above and below, and at certain intervals between the extremities, by rings. When the rings lie in the vertical position the wires are separated from each other only by the thickness of the rings, but when the latter are thrown into the horizontal position the two wires become separated, and, with the rings, constitute a kind of skeleton speculum.[4] At the top of the back wire there is a slot into which the stem of a laryngeal mirror is fitted. In the upper figure (A) of the annexed cut it will be seen that the handle and shank are almost in a line—a position which greatly facilitates the introduction of the instrument. When the vertical portion has been passed down the œsophagus, the operator, holding the handle in his hand, but leaving the index-finger free, presses with the latter on the upper part of the shank near the handle. The result of this is to turn the rings from the vertical to the horizontal position, and thus to open the speculum and expand the gullet. With the view of causing as little irritation as possible, the operator should, before withdrawing the instrument, close the speculum by pressing the under part of the shank (near the handle) with his thumb, and at the same time raising the handle.

---

[1] Letter before quoted. The Professor does not recollect the exact date of the exhibition of the patient, but no doubt an account of it would be found in the "Transactions of the Imperial-Royal Society of Physicians of Vienna" in or about the year 1871.

[2] Loc. cit.

[3] This, as well as most of my other instruments described in this work, were made for me by Messrs. Mayer and Meltzer, Great Portland-street.

[4] In the earlier instrument which I employed there were a great number of rings, and the speculum was opened and closed by means of a movable slide on the upper part of the shank, the handle remaining fixed.

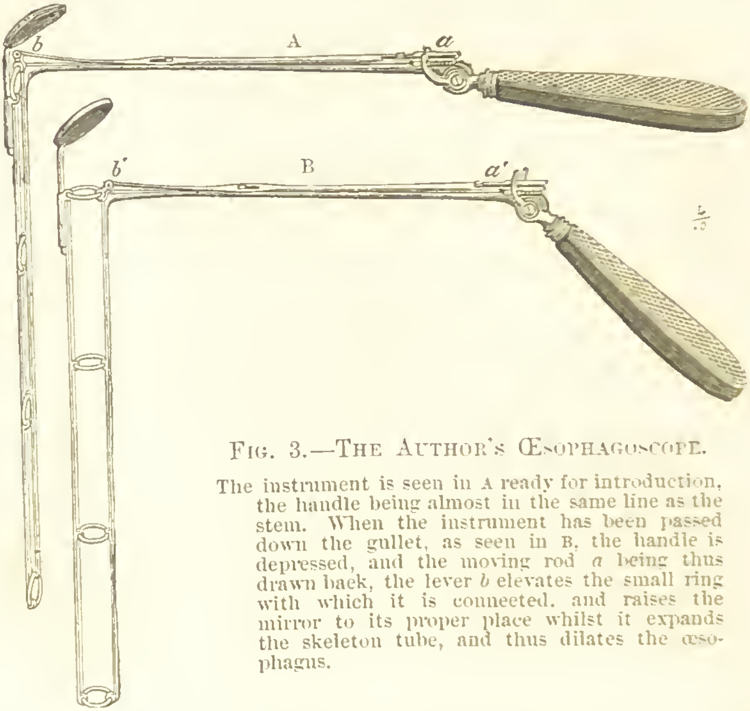

Fig. 3.—The Author's Œsophagoscope.

The instrument is seen in A ready for introduction, the handle being almost in the same line as the stem. When the instrument has been passed down the gullet, as seen in B, the handle is depressed, and the moving rod *a* being thus drawn back, the lever *b* elevates the small ring with which it is connected, and raises the mirror to its proper place whilst it expands the skeleton tube, and thus dilates the œsophagus.

In November, 1880, I had attempted to use the instrument on fifty patients, and I had succeeded thirty-seven times. Subsequently I have employed it from time to time, whenever a suitable case has presented itself.

Endeavours have recently been made to examine the interior of the gullet with the help of the electric light, and Mikulicz[1] claims to have made some very important clinical observations by this method.

---

[1] "Wien. med. Presse." 1881. Nos. 45—52. Mikulicz, who has lately been working with the assistance of Leiter, of Vienna, appears

ŒSOPHAGEAL INSTRUMENTS.

Brushes.—These are of little use for applying remedies to the interior of the œsophagus, as the medicament is to a great extent lost before it reaches the affected part; but they are sometimes of service when the disease is situated quite at the upper part. The kind of brush which should be employed for this purpose is one similar to those used for the larynx, but about two inches longer than No. 1 brush.

Injectors.—For applying solutions to the interior of the gullet the "œsophageal injector" is the most useful instrument. It consists of a long leaden tube, from sixty to seventy-five centimetres in length, and two to three millimetres in diameter, to which is welded a bulbous terminal portion, made of silver. The silver extremity is perforated by a number of fine holes, and the fluid is injected by means of a minute pear-shaped india-rubber ball. The tube is passed down to the desired spot; the nozzle of the elastic ball is then introduced into the upper end of the pipe, which is slightly funnel-shaped, and the fluid injected by pressing the ball.

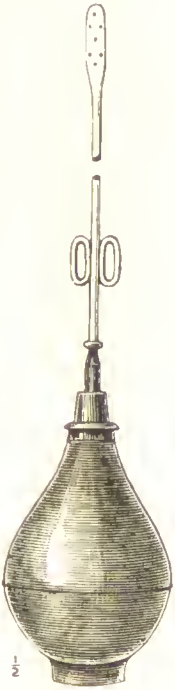

Fig. 4.
Œsophageal Injector.

The Œsophageal Electrode.—This instrument is similar to the laryngeal electrode (Vol. i. p. 252), but should be about twenty-six centimetres in length below the handle, and pliant in the stem, so that it may more readily adapt itself to the natural curves of the gullet.

The Œsophageal Resonator.—For the discovery of small foreign bodies, such as pins or other metallic substances, pieces of bone, &c., an ingenious instrument has been devised by

to have improved the apparatus of that instrument maker (see Vol. i. p. 502, Note 2). When, however, Leiter's earlier specula were exhibited in Paris, Dr. Ranse ("Gazette Médicale," No. 25, p. 331, 1880) maintained that the invention was little more than a reproduction of Trouvé's "polyscope," without some of the advantages of that instrument.

M. Duplay.[1] It consists of a stem of very flexible steel, about eighteen inches long, covered throughout with india-rubber; to the lower end of this is screwed a hollow olive-shaped ball of ivory, which may be of various sizes, whilst to the upper end of this is attached a "drum" of copper, about six inches long, to serve as a sounding-box. To the proximal end of the drum is fixed an india-rubber tube, provided with an ivory ear-piece. The instrument is passed into the gullet in the ordinary way, and the ear-piece placed in the ear. Very slight scratching sounds, such as would be produced by the olive-shaped ivory ball coming in contact with a foreign body, can then be readily distinguished. If the stem of the instrument be properly graduated the situation of the foreign substance can also be ascertained with tolerable accuracy.

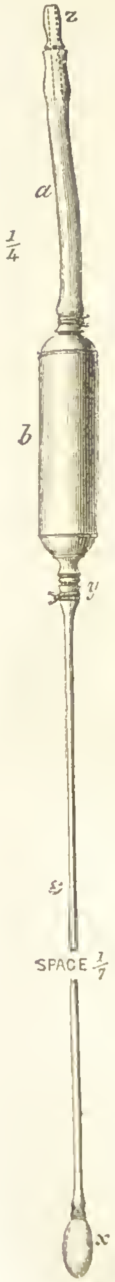

Fig. 5.—Duplay's Œsophageal Resonator.

a, india-rubber tube; *b*, sounding-box of copper; *c*, metallic stem covered with india-rubber; *x*, olive-shaped ivory ball; *y*, junction of stem to sounding-box; *z*, ivory earpiece.

It should be added that the instrument can be used as a common sound by detaching the sounding-box and ear-tube from its upper extremity and screwing on a metallic ring, to serve as a handle.

Œsophageal Forceps.—For the removal of foreign bodies from the gullet, a pair of long forceps may suffice, or specially-devised instruments, such as the parasol bougie, or the so-called "coin-catcher" may be required. The forceps should be about thirteen inches long, the two blades crossing each other at a point equidistant from the extremities. The curve should be very slight (Fig. 6). Forceps with a flexible stem may also be useful in extracting foreign bodies from the gullet, or Burge's forceps, of the same shape as that used for the nose, may be employed. The mode in which this instrument acts will be understood by referring to the woodcut representing the Axial

---

[1] "Bull. de la Soc. de Chir. de Paris." Oct. 7, 1874.

Nasal Forceps (see Nasal Instruments).

The Parasol Probang.—This instrument consists of a whalebone rod, terminating in a twist of stiff horse-hair, which is capped at the extremity by a small metal knob or sponge. The whalebone rod is enclosed in an outer gum-elastic tube. The instrument should be passed in the same manner as the ordinary bougie, if possible, beyond the supposed position of the foreign body. Holding the gum-elastic tube in the left hand, the surgeon should then slightly draw up the whalebone rod with the right hand, the horse-hair portion being thus made to expand like a parasol. In withdrawing the instrument with both hands, the whole interior of the œsophagus is thus swept out, and any small foreign body is almost certain to be entangled in the meshes of the expanded web of horse-hair. If the resistance is so great as to cause risk of injury to the soft structures, the whalebone rod controlling the parasol should be released and the instrument withdrawn

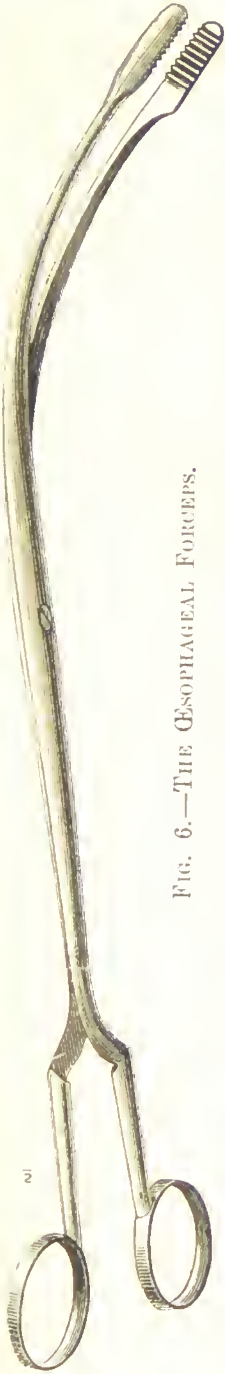

Fig. 6.—The Œsophageal Forceps.

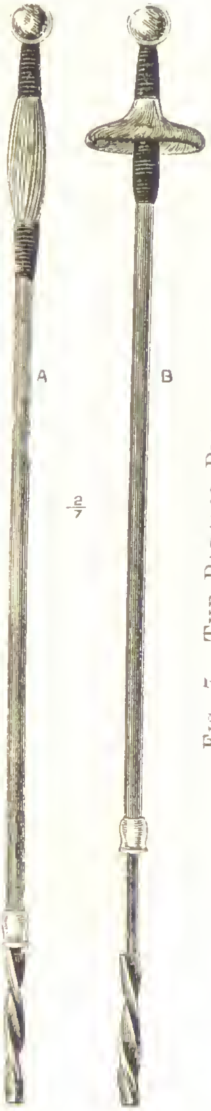

Fig. 7.—The Parasol Probang.

A, the instrument ready for use with the catgut parasol closed.
B, the instrument after it has been passed down the throat with the parasol open.

with its expansile portion closed. In the probang, as commonly made, the knob is about the size of a bullet, but it should not be larger than a good sized pea—the object of the instrument not being to push the foreign body down, but to pull it up.

Coin-Catchers.—There are two kinds of coin-catchers. One (Fig. 8 A) consists of a small whalebone rod, about fifteen inches long, with a flexible metal plate one inch and a half in length securely fixed to its lower part. The distal extremity of the metallic plate is attached by means of a cross rivet to the interior of a small hollow metal cone about its middle. Free play is thus allowed to the cone on either side of the stem, so that a little cradle is formed, the concavity of which looks upwards. The surfaces of the cone which correspond to the metallic part of the stem are fenestrated, whilst the rim of the cradle is slightly notched at each side. Another form of coin-catcher (Fig. 8 B) which is perhaps more commonly employed, consists like the above, of a whalebone rod, to which a short plate of flexible metal

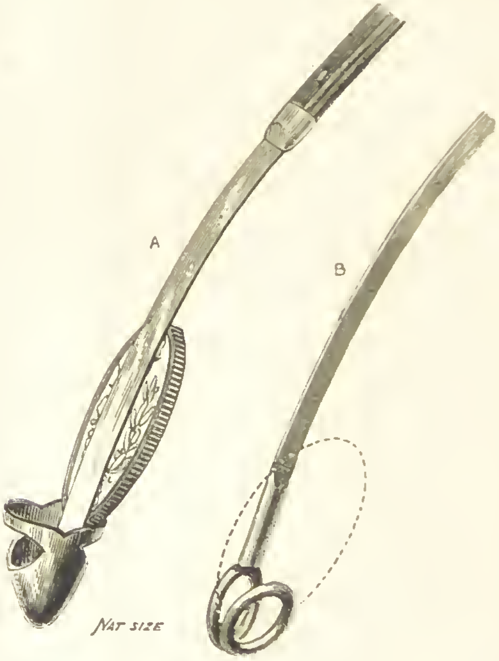

FIG. 8.

A, Gräfe's coin-catcher, holding a coin; B, ring coin-catcher.

is attached. This plate, however, ends in a small metal ring, to the lower part of the circumference of which another ring of similar size is securely welded so as to form an angle of about 45° with its fellow.

Both these instruments easily slip down at the side of a small foreign body, but on being withdrawn, a piece of money or any other object lying loose in the canal, such as a fruit stone, or a set of artificial teeth, is very likely to be caught. Even when such a body has passed into the *stomach* it may sometimes be fished up! A remarkable case of the kind has been recorded[1] in which Mr. L. S. Little, formerly of the London Hospital, succeeded in removing a set of false teeth with a gold plate from the stomach of a woman who had swallowed them during an epileptic fit.

The Sponge-Probang.—This instrument is merely a gum-elastic bougie, tipped at its distal end with a piece of sponge securely tied on. It is used for pushing down into the stomach any substance of the nature of food which has stuck in the gullet, or a foreign body of any kind which cannot be extracted.

The Œsophagotome.—For the internal division of strictures of the gullet, various instruments have been invented, particularly by French surgeons. I have devised a very simple instrument (Fig. 9) which has been successfully used, both by myself[2] and by Dr. Roe,[3] of Rochester (U.S.) It consists of a gum-elastic bougie about fifteen inches long, terminating in a small metal cap about one inch in length and of slightly larger calibre than the rest of the instrument. Through the interior of the bougie passes a wire, the lower end of which is attached to a small cutting blade, whilst its upper extremity is connected with a spiral spring. By pressing a

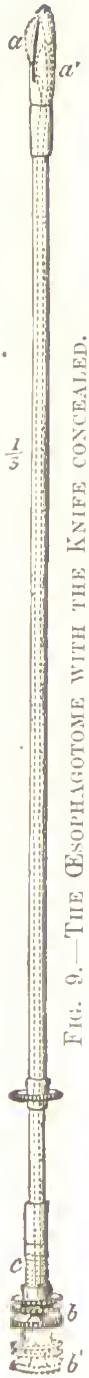

FIG. 9.—THE ŒSOPHAGOTOME WITH THE KNIFE CONCEALED.

a, the protruded knife ; a', the concealed knife ; b', the button which acts on spring ; b, the button pressed down ; c, sliding tube containing the spring.

---

[1] "Royal Med. and Chir. Soc. Proc." Feb. 8, 1870 ; "Lancet," Feb. 19, 1870, p. 268.

[2] For details of my case see "Cicatricial Stricture of the Gullet."

[3] Ibid.

metallic button at the top of the bougie, the knife is projected through a slit in one side of the metal cap. A little notch in the edge of the button corresponding to the slit guides the operator as to the position of the knife. Instruments with two blades cutting sideways have been used by Trélat[1] and Dolbeau[2] for the division of œsophageal strictures, but a single blade seems to me preferable, and the close proximity of the internal and common carotid arteries at the upper part of the gullet on both sides and of the aorta lower down on the left side, makes it desirable that the knife should cut only in a backward direction.

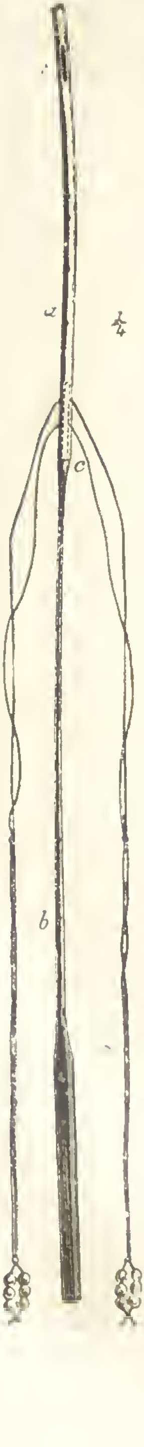

FIG. 10.—PERMANENT ŒSOPHAGEAL TUBE.

a, gum-elastic catheter; *b*, whalebone pilot rod; *c*, strings; *d*, side opening in tube.

The Permanent Œsophageal Tube.—This instrument (Fig. 10), which I have used for several years with considerable success, consists of two parts: the lower portion being a fine gum-elastic catheter, of No. 6 size (English), about six inches in length. To the upper end of this tube are attached two strings, about one foot long, and loaded at their free extremity with small shot. The upper part of the instrument is a solid stem, made of vulcanite or whalebone, the lower extremity of which is pointed so as to fit loosely for about an inch into the upper orifice of the catheter. The instrument should be passed down the gullet in the manner recommended in describing the use of solid bougies, the strings being held close to the upper part of the whalebone guide, so as to keep its point inside the catheter. When the latter has been passed through the strictured portion of the canal, the solid stem or handle should be withdrawn, care being taken to release the strings so that the catheter may not be pulled out at the same time. The strings should then be fastened round the patient's ears or the back of his head. The catheter is thus left in the narrowed part of the gullet, and liquids can be swallowed with comparative ease. The great advantage of the instrument is, that it causes no pharnygeal irritation. It can generally be allowed to remain *in situ* for five or six days, when it should be removed by means of the strings, as the gum-elastic is likely to be decomposed, or the tube itself clogged up. Another instrument may then be substituted for it in the same manner. It is to be remarked that I only employ this instrument where absolute aphagia exists, and that generally the catheter has to be pushed through the stricture with force.

---

[1] "Bull. Thérap." Mars 30, 1870, t. lxxviii. p. 252.

[2] "Soc. de Chir. de Paris," Mars 16, 1870.

Dr. Krishaber,[1] of Paris, has lately recommended that in cases of advanced stricture of the gullet a common gum-elastic catheter of suitable size should be passed into the patient's stomach through one of his nostrils,[2] and left permanently *in situ*. The instrument is fixed in position by means of a strong needle transfixing the catheter near its mouth, and having attached to its ends two strings, which are fastened to the brow with strips of plaster. A plug should be left in the upper end of the tube, except when the patient is being fed. By means of this instrument Dr. Krishaber has been successful in prolonging for several months the lives of patients who must otherwise inevitably have died of starvation. In one case, indeed, life was maintained in this manner for the greater part of a year (305 days). Mr. Durham[3] has successfully tried the same plan, but prefers passing the catheter through the mouth, as being less disagreeable to the patient.

The Œsophageal Feeding Tube.—This instrument is very useful when there is a fistulous communication between the gullet and the air-passage, which allows the ingesta to find their way into the larynx or trachea. The instrument consists of three portions: first, a gum-elastic tube of the size of a No. 8 English catheter, terminating at one end in a slightly bulbous extremity perforated laterally by two rather large holes, and at the other in a metal ring and bayonet joint; secondly, a pear-shaped india-rubber bottle; thirdly, a connecting portion of metal tubing provided with a screw and a tap. The mode of using this instrument is as follows:—The connecting portion is first unscrewed and the nutritive fluid poured into the bottle, when the metal tubing is again screwed on, and the tap closed. The practitioner now introduces the gum-elastic tube into the œsophagus, and an assistant at once hands him the feeding bottle, which he quickly adjusts to the bayonet joint, and turning the tap, injects the fluids. As there is generally great irritability of the throat in such cases, the success of the operation largely depends on the quickness with which it can be performed. In cases of emergency, where

---

[1] "Trans. Intern. Med. Congress." London, 1881, vol. ii. p. 392, et seq.

[2] In insane persons, or others who perversely refuse food, this method of administering sustenance is most efficacious, as any difficulty in opening the patient's mouth is thereby avoided, and he is unable to apply his teeth to the instrument, or to the fingers of the operator.

[3] "Proc. Clin. Soc. Lond." Nov 11, 1881, reported in "Lancet," Nov. 19, 1881, vol. ii. p. 873.

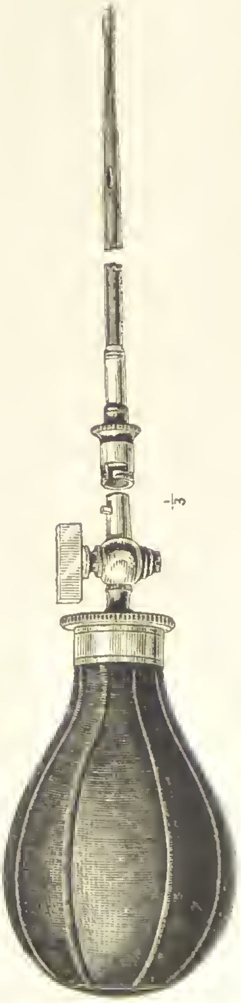

Fig. 11.
Œsophageal Feeding
Tube.

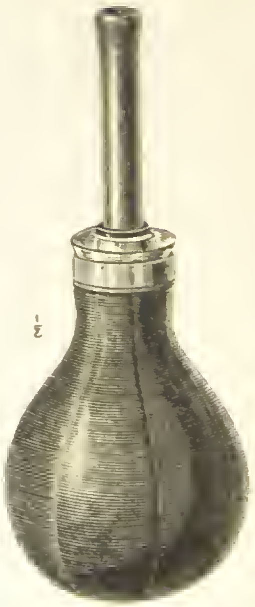

Fig. 12.
The Rectal Feeding
Bottle.

this instrument is not at hand, a common catheter and an ordinary enema-bottle can be used, but the tap and bayonet joint greatly facilitate the operation of feeding.

The Rectal Feeding Bottle.—It so often happens that in diseases of the throat feeding *per rectum* becomes necessary, that this seems to be the appropriate place for describing the instrument which will be found most serviceable for the purpose. The ordinary liquid injections, such as beef-tea, eggs, milk and brandy, have proved so unsatisfactory in my hands that I have for a long time employed the panada first recommended by Leube (see Appendix, Vol. i. p. 580). As this panada, however, will not pass through an ordinary enema pipe, it is necessary that the elastic bottle should be furnished with a short vulcanite tube, having a bore of not less than half an inch. The difficulty of drawing up the nutritive fluid through the tube by the common vacuum process, makes it requisite that the vulcanite nozzle should be capable of being easily unscrewed, in order that the bottle may be filled with a spoon or funnel.

DISEASES OF THE GULLET.

ACUTE ŒSOPHAGITIS.

Latin Eq.—Œsophagitis acuta.
French Eq.—Œsophagite aigüe.
German Eq.—Acute Entzündung der Speiseröhre.
Italian Eq.—Esofagite acuta.

DEFINITION.—*Acute idiopathic inflammation of the mucous membrane of the œsophagus, giving rise to extreme odynphagia, and often to aphagia. The disease is attended with some danger, but generally ends in resolution, and only in extremely rare cases terminates in ulcer, abscess, or gangrene.*

History.—Amongst the ancient physicians Galen[1] alone appears to have recognized this disease. After referring to difficulty of swallowing caused by tumours and paralysis, he observes that when the œsophagus is affected by inflammation the condition of the part itself acts as a hindrance to the passage of food; deglutition, moreover, being accompanied by excruciating pain. In 1722 Boehm[2] called attention to the complaint, especially dwelling on the pain and heat which "reach even down to the stomach, accompanied by hiccough and a constant flow of serum from the mouth." In 1745 Van Swieten[3] gave a short account of the affection, obviously based more upon literary research than experience. Honkoop[4] published a thesis on inflammation of the gullet in 1774, and in 1785 Bleuland[5] described the disease in his short treatise on the œsophagus. Bleuland's remarks are entitled to special weight, inasmuch as he had himself suffered from a violent attack of the disorder, whereas the previous accounts of this rare affection appear to be entirely founded on Galen's description, which is admirably accurate so far as it goes, but necessarily incomplete. Besides his own attack Bleuland states that he was acquainted with the details of four other cases of the complaint which had occurred in the practice of his master Van Doeveren. A good description of the disease was given in 1792 by John Peter Frank,[6] who first proposed to designate it by the name "œsophagitis." Some years later the pathology of inflammation of the gullet as it is met with in new-born children was studied with great zeal and ability by Billard,[1] who in 1828 published a number of very interesting cases of the affection, together with some important observations as to its etiology. In 1829 Mondière[2] who, like Bleuland, had had an opportunity of observing the disorder in his own person, chose it as the subject of his inaugural thesis, and described the symptoms and course of the affection very accurately. He founded his pathology, however, entirely on Billard's description of the appearances in fatal cases occurring in new-born infants—cases which differ widely as to their etiology, nature, and course, and cannot be accepted as affording a satisfactory basis for the pathology of idiopathic œsophagitis in adults. In 1831 Mondière[3] returned to the subject, treating it with fuller learning, but with no further novelty. In 1835 Graves[4] made some remarks on œsophagitis in commenting on a case of the disease which he had been called upon to treat. The subject has received additional illustration from Hamburger,[5] Padova,[6] and Laboulbène.[7]

---

[1] "De locorum affect. notitiâ," lib. v. cap. iv.

[2] "Dissertatio de morbis œsophagi." Halæ, 1772. This was a thesis presented by Boehm for the doctor's degree, under the academical presidency of the celebrated Hofmann, to whom the work has generally been ascribed by subsequent writers.

[3] "Comment. in H. Boerhaave aphorismos." Lugduni Batavorum, 1745, t. ii. p. 662, § 804.

[4] "Diss. de morbo œsophagi inflammatorio." Lugduni Batavorum, 1774.

[5] "Obs. anat. med. de sanâ et morbosâ œsophagi structurâ." Leidæ, 1785.

[6] "De curandis hominum morbis," lib. ii. pp. 104, 105. Mannhemii Tubingæ, Viennæ, 1792—1821.

Etiology.—This affection is certainly very rare, but not so rare as the exceedingly brief description, and frequent complete omission of the subject from the ordinary text-books of surgery and medicine, would lead the student to imagine. It is highly probable that the very insufficient way in which the subject has been handled is the cause of the complaint often not being recognized, and I venture to hope that in future the true nature of some cases will be appreciated which might otherwise have been overlooked.

There are not sufficient examples on record to enable us to arrive with any degree of certainty at the cause of this affection in adults. Occasionally it appears to originate in the pharynx and to spread downwards, and in some epidemics of "angina" this tendency has been very remarkable;[1] in one instance the disorder seems to have extended upwards in the course of a general inflammation of the intestinal tract, but the disease in this case was complicated by ague.[2] In an example related by Laboulbène,[3] the drinking of cold water was the only assignable cause. Mondière[4] reports one case in which the disease followed an attack of inflammation of the stomach, but the actual occurrence of the œsophageal mischief was attributed to a dose of castor oil. Another instance is on record[5] where the onset of the complaint was attributed to violent muscular exertion in a fit of passion, but the nature of the case was somewhat obscure, and by some physicians it was thought that there was partial rupture of the muscular fibres of the œsophagus. Out of five cases which I have myself met with, in one the disease was caused by direct application of cold to the lining membrane of the gullet through eating ices; in a second the supposed cause was the abuse of alcohol; in a third the attack followed accidental immersion in a river; whilst in the remaining two the malady occurred in patients who were subject to rheumatism.

---

[1] "Maladies des Enfants nouveau-nés." Paris, 1828. See also 3rd edition, 1837.

[2] "Sur l'Inflammation de l'Œsophage." Thèse de Paris, 1829. Mondière afterwards studied diseases of the gullet in general with much assiduity, and collected a large amount of material scattered through various writings. Although his laborious compilation shows more industry than discrimination, his essays are of very considerable value even at the present day, for, in spite of his somewhat unwieldy erudition, he was a shrewd observer. His writings have been the source from which much of the literature of œsophageal disease has since been drawn. Thus in Velpean's article ("Œsophage"—"Dictionnaire en Trente Volumes"), in Follin's essay ("Sur les Rétrécissements de l'Œsophage"), in Copland's Dictionary, and lastly in the highly creditable work of Knott on the "Pathology of the Œsophagus," Dublin, 1878 (published whilst the author was still *in statu pupillari)*, we find the cases of Roche, Bourguet, Broussais, Paletta, and several others collected by Mondière, constantly referred to, with very few original illustrations of the disease. On the other hand, but scanty justice has been done to Billard, whose work in this field was the fruit of careful independent investigation.

[3] "Arch. Gén. de Méd." 1831, t. xxv. p. 358.

[4] "Clinical Lectures." Dublin, 1848, vol. ii. p. 199. 2nd edition. Previously reported in "Lond. Med. and Surg. Journ." No. 172.

[5] "Medicin. Jahrb." Bd. xviii. and xix. December 8 and 22, 1869.

[6] "Annali Universali di Medicina e Chirurgia." Milano, Aprile, 1875, vol. ccxxxii. pp. 17—24.

[7] "Nouveaux Éléments d'Anatomie Pathologique. Paris, 1879, p. 84.

Symptoms.—In adults the most marked symptom is odynphagia, the pain on attempting to swallow being often of a most excruciatingly burning or tearing character, and sometimes reaching such a degree of intensity that the patient is obliged to desist altogether from taking food or even drink. Even when he is not swallowing there is often a dull aching sensation in the pharynx behind the jugular fossa or the ensiform cartilage. Pressure made by the surgeon on the larynx or trachea from before backwards intensifies this uncomfortable feeling. The patient generally complains of stiffness of the neck, and holds his head in one position, the least movement aggravating his suffering.

He is usually unwilling to speak on account of the pain caused by any action of the laryngeal muscles. There is not unfrequently a sensation as of a foreign body in the throat. Padova's[6] patient described a feeling like a *knot* in the throat, whilst in Graves's[7] case the sensation was that of a *ring*, beyond which the food could not pass. The patient almost always experiences great thirst, and being unable to get relief by drinking, he is much tormented by this distressing symptom. The earlier writers lay great stress on hiccough as an unfailing accompaniment of this malady, but it has not been present in any of the cases that have come under my notice. When the inflammation is slight, it may give rise to spasm of the œsophagus, a condition which will be hereafter considered. If the mischief extend to the ary-epiglottic folds, dyspnœa may supervene. In adults the constant expuition of frothy or glairy mucus is very characteristic. In all my five cases this symptom was present.

---

[1] "Annales de Montpellier," t. iv. p. 87.

[2] Padova: "Annali Univ. di Med." Milano, Aprile, 1875.

[3] "Nouveaux Éléments d'Anatomie Pathologique." Paris, 1879, p. 84.

[4] "Arch. Gén. de Méd." t. xxiv. [5] Ibid. [6] Loc. cit. [7] Loc. cit.

The general symptoms are those of irritative fever, but not of a high degree; in no case that I have met with has the temperature been above 102° F., and the pulse has not exceeded 130. Occasionally, however, there is some delirium. Bleuland[1] himself suffered from this complication, and it was present in one of my cases.

It is probable that in some instances the inflammation becomes really purulent in character, but this has not occurred in my own experience, and I have not met with a single recorded example of idiopathic origin in which it was observed. Should the inflammation, however, result in the formation of an abscess, rigors occur, and the local symptoms generally become intensified for the time. When the abscess bursts, blood and pus are expectorated, and a rapid recovery usually takes place. When the disease is confined to a particular portion of the gullet, its situation can be ascertained by auscultation, the œsophageal sound abruptly terminating immediately below the point of inflammation.

When once a favourable change has set in, convalescence is generally pretty rapid, although Mondière asserts that he was obliged to take his food cold for many months after recovery from the acute symptoms. If, as is usually the case, the inflammation gradually subsides, the difficulty of swallowing and other symptoms pass off; but if ulceration should take place, the symptoms persist in full force, the pain becoming more severe and more constant. If the expectoration is frequently tinged with blood, ulceration may be suspected.

Pathology.—It is probable that in acute œsophagitis the usual phenomena of catarrhal inflammation of mucous membrane are present—that is to say, there is great redness of the membrane, together with succulence of the epithelium and increased secretion of watery fluid containing imperfectly-developed epithelial cells. The abundant secretion which occurs during life comes not only from the œsophagus but from the pharynx and the salivary glands, which appear to be sympathetically stimulated. Zenker and Ziemssen,[1] following Klebs, assert that inflammation of the gullet is altogether different from inflammation as it affects other mucous membranes, but this view is not borne out by the only case of idiopathic œsophagitis in which the *post-mortem* appearances have been recorded. In this instance the following changes were observed chiefly at the upper and lower ends of the tube :—"The mucous membrane was red but not ulcerated, extremely congested and thickened ; the glands were more prominent than usual, the mucous membrane was covered in several places with a glutinous grey, or greyish-yellow coating, which could be washed off. On section the submucous tissue appeared to be thickened and infiltrated with liquid. Strong pressure between the fingers made it thinner. There was no pus to be seen. Microscopically, the viscous coating was found to consist of mucus with abundant epithelium cells and pus corpuscles." [2]

---

[1] Loc. cit.

Although as a rule the acute inflammation rapidly subsides, yet occasionally it leads to *ulceration*. This appears to have occurred in the case recorded by Paletta,[3] in which a young woman who died from extensive inflammation of the throat, involving the pharynx, larynx, and œsophagus, was found to have a large ulcer on the anterior wall of the gullet. Mondière[4] also mentions the case of a woman who succumbed to an attack of œsophagitis, terminating after four months' illness in ulceration of the œsophagus, for which there appeared to have been no other cause than simple inflammation.

It rarely happens that the inflammation leads to the formation of a distinct *abscess*, though this sequel is common enough in cases of traumatic origin. Three instances, however, are on record, in which œsophagitis terminated in abscess ; in one[5] of these the sac was accidentally opened by the pressure of a bougie, whilst in the others spontaneous rupture occurred, and pus was continuously expectorated, in one case[6] for three or four days, and in the other[7] for a fortnight.

---

[1] Op. cit. vol. viii. p. 135.

[2] Laboulbène : Op. cit. p. 84.

[3] "Exercit. Pathol." 1820, p. 228.

[4] "Arch. Gén. de Méd." t. xxiv.

[5] Bourgnet : "Gazette de Santé." 1823, p. 221.

[6] Padova : Loc. cit.

[7] Barras : "Arch. Gén. de Méd." 1825.

More rarely still the disease ends in *gangrene.* I know of only two instances in which this termination is recorded. In one[1] of these the patient was a man, aged thirty-eight, who was suffering from purpura and general inflammation of the gastro-intestinal canal, and the mucous membrane of the œsophagus was found thickened and of an inky-black colour. The other[2] occurred in a man, aged sixty, in whom the gullet was found to be gangrenous from its upper extremity to within an inch of the cardiac orifice of the stomach. The whole thickness of its wall was sphacelated, the lining surface, however, being most involved.

It is possible that there may sometimes be a *myalgic* condition of the œsophageal walls rather than actual inflammation, but such a disorder would of itself give rise to no appreciable pathological change.

Diagnosis.—The extreme odynphagia and the absence of all inflammation of the pharynx, or of the framework of the larynx, as ascertained with the help of the laryngoscope, strongly point to acute disease of the œsophagus. The pain which is experienced on pressure of the larynx and trachea backwards, is more marked than when the air-passages are themselves inflamed. Mondière attaches much importance to the sensation of heat which is felt at the lower part of the neck, when, at the same time, there is entire absence of any redness in the throat. The same author also refers to the intense anxiety often manifested by the patient, a symptom which is usually aggravated by attempts to swallow even fluids. This has sometimes led to the disease being mistaken for hydrophobia. In that complaint, however, solids can often be swallowed when the very sight or even the sound of fluid will bring on a severe spasm. Moreover, the general hyperæsthesia, asphyxial paroxysms, and psychical phenomena of hydrophobia are all so characteristic that, when once seen, little confusion is likely to arise between that disease and œsophagitis. Pericarditis with abundant effusion sometimes causes pressure on the œsophageal canal, and occasionally gives rise to dysphagia, but seldom to any considerable amount of odynphagia. In pericardial affections, moreover, the pain is generally limited to the epigastric region; in these cases the physical exploration of the chest at once determines the nature of the affection. It need scarcely be said that in acute inflammation of the gullet neither the œsophagoscope nor the bougie can be used.

---

[1] Habershon: "Diseases of the Abdomen." 1878, 3rd ed. p. 53.

[2] "Arch. Gén. de Méd." t. xxiv.

Prognosis.—This is generally favourable, but in at least two cases, viz., in that of Padova and in one of my own, the patient was in a very critical condition. In Laboulbène's case, the patient died suddenly from cerebral hæmorrhage.

Treatment.—The most important element in successful treatment consists in maintaining the œsophagus in a state of absolute rest. It does not require any persuasion on the part of the physician to secure this condition, for if the symptoms are at all severe the patient is quite unable to swallow. Nutrient enemata should be administered, unless the inflammation rapidly subsides, and morphia must be given hypodermically. Poultices should be applied along the upper part of the spine; or if there be much pain, anodyne embrocations, such as the oleate of morphia (gr. $\frac{1}{10}$ ad ℥j.) and belladonna liniment may be rubbed into the back. Mondière insists on the importance of venesection, cupping, leeching (from twelve to thirty leeches being applied to the side of the neck), counter-irritation (mustard poultices and moxas), and derivatives. General bleeding, however, or even the local abstraction of blood to the extent recommended by Mondière, is not likely to be carried out in the present day, and I have not found any benefit from counter-irritation. Derivatives, on the other hand, especially very hot pediluvia, are often of signal service. Bleuland used blisters "*loco dolenti*" between the shoulders with success.

Pagenstecher[1] has reported two cases in which he attributed considerable importance to the internal use of hydrochlorate of ammonia. It may be remarked, however, that fifty years ago this drug was highly lauded by physicians (especially the Germans and Dutch) as a remedy for almost every kind of disease.

The passage of bougies can only do harm, and should never be attempted, in spite of a case related by Mondière,[2] in which an abscess was accidentally ruptured in this way, and the patient thereby cured.

When convalescence commences the change from a liquid to a solid diet should be very gradual, and should pain in deglutition recur, the patient must be again immediately restricted to fluids.

---

[1] "Journal von Hufeland." 1827, p. 51.

[2] See antea, case of Bourguet.

CASES ILLUSTRATING ACUTE ŒSOPHAGITIS.

Case 1.—Mr. A. W., aged twenty-six, applied to me in July, 1868, on account of great pain and difficulty in swallowing. He stated that he first noticed this two days previously, and that it came on the morning after he had been at a ball where he had eaten several ices. He acknowledged that he had become very hot in dancing, and had gone out of the ball-room into the open air though the evening was fresh; but he attributed the throat affection to eating ices, because he had once before had a similar attack produced in that way, whilst he had often exposed himself to cold after dancing without any ill effects. He said that he had scarcely been able to swallow any food for the last two days, having been quite unable to take solids, and fluids causing great pain. He had slept very badly the last two nights, owing to the quantity of saliva, which repeatedly woke him by giving rise to attacks of coughing. When first seen by me, his condition was as follows:—He swallowed some water, which caused great pain opposite the seventh dorsal vertebra, and which he said darted upwards to the back of his throat. His power of deglutition was then tested with solids, and it was proposed that he should try bread, meat, and potato. He succeeded in getting down a small piece of stale bread, but was obliged, at the same time, to drink water; the effort, however, caused him very great pain, and he was unable afterwards to swallow either the meat or the potato. On examination with the laryngoscope, the pharynx and larynx were seen to be quite normal. This patient was treated with hypodermic injections of morphia, but they were used only five times. For two days nutritive enemata were employed, but afterwards the patient sucked ice and swallowed iced milk and cold beef-tea. Nine days after the first occurrence of the inflammation he was able to take semi-solids, and a few days later he could swallow any cold or tepid food. At the end of a month he was still obliged to be careful in his diet.

Case 2.—Charles E., aged forty-one, night watchman in a warehouse, came under my care at the London Hospital in February, 1873, on account of chronic rheumatism affecting the right knee and left ankle. The patient had suffered from two attacks of acute rheumatism, for both of which he had been treated in the hospital. He was placed on iodide of potassium and bicarbonate of potash. After being under treatment for a month with slight benefit he was suddenly attacked by severe odynphagia, together with a constant flow of glairy saliva. He experienced, just above the level of the upper border of the sternum, a burning pain, which was greatly increased by pressure on the front of the trachea. For three days the patient was unable to take any food or drink, and he was scarcely able to sleep at all owing to the mucous secretion passing down into the larynx, whenever he began to lose consciousness, and giving rise to paroxysms of coughing. He was obliged constantly to sit up and support his head between his hands. The pharynx and upper part of the larynx were seen to be healthy. Nutrient enemata were administered on two occasions, but the patient objected to them so much that they had to be discontinued. Subcutaneous injections of morphia relieved the constant burning pain, but did not produce sufficient anæsthesia of the œsophagus to allow deglutition. On the fourth day from the establishment of the severe symptoms the patient was able to swallow a little milk, and at the end of a fortnight could eat almost anything when cold, though hot food still caused pain.

Case 3.—Henry E., aged twenty-three, consulted me on June 24. 1875, on account of difficulty of swallowing. He stated that two days previously he had been upset from a boat on the Thames, and that it was some time before he was rescued. After being brought to the shore he became insensible, and remained in this condition for more than half an hour. Next day he was very feverish, and in the afternoon felt difficulty in swallowing. In the evening, whilst trying to take some soup, it was violently thrown back through the nose. The same night he was slightly delirious; he was scarcely able to sleep, being obliged to sit upright and expectorate saliva. The next day, when I saw him, he was feverish, the pulse being 120 and the temperature 101·5° F. He was spitting up large quantities of ropy mucus. The lower part of the pharynx and the epiglottis were seen to be slightly inflamed, but the interior of the larynx and trachea was normal in appearance. The patient swallowed a little water in my presence, but declined to take a second spoonful on account of the great pain it caused. The following day the difficulty of swallowing still continued; the patient complained of severe thirst, but was unable to swallow little lumps of ice, or even iced water. On the morning of the fourth day he was able to get down a small quantity of cold soup, and a few hours later he took a large drink of milk. From this date he rapidly improved, and at the end of a week from the commencement of the attack he was perfectly well. The only treatment in this case consisted in subcutaneous injections of morphia.

Case 4.—Mr. W., aged forty-seven, who had a short time before been suffering from subacute rheumatism, sent for me on May 27, 1879, on account of difficulty of swallowing which had come on the previous evening. Examination with the laryngoscope showed that the larynx was healthy, and the pharynx also appeared quite normal. Mr. W. said that he could swallow, but that it caused him great pain at a point which he indicated midway between the cricoid cartilage and the upper edge of the sternum. There was no expectoration. I ordered the patient to suck ice. In the evening, feeling much worse, Mr. W. sent for me again. He informed me that he was unable to take the ice, as it caused him so much pain. He had begun to expectorate frothy mucus. I administered morphia subcutaneously. The next day he felt better, but could not yet swallow at all. The subcutaneous injection was repeated, and a nutrient enema was administered. (See Vol. i. p. 580.) The patient was fed by enemata for five days; after this he began to swallow, but for three weeks he experienced difficulty at times. Indeed, one month after the date of the attack, whilst swallowing a piece of potato he felt so much pain and difficulty that he thought his old symptoms were returning. This, however, did not prove to be the case.

Case 5.—There was nothing remarkable about this case. The patient was a lady aged twenty-seven, who had recently suffered from rheumatism and pleurisy. The attack of œsophagitis occurred in November, 1880, and was not so severe as those above described. Belladonna plasters applied to the back between the shoulders gave much relief, and no hypodermic injections were used.

ŒSOPHAGITIS IN INFANTS.

As already remarked, Billard[1] was the first to call attention to this affection, and soon afterwards Ryan[2] described it in almost identical terms. Though his lectures contain no reference to Billard, there can be little doubt as to the source of his information. Subsequent English writers have altogether passed over the disease.[3]

The predisposing *cause* of the affection in infants appears to be the physiological hyperæmia of the gastro-intestinal mucous membrane which exists at birth. Out of 200 bodies of newly-born children, free from any sign of disease, Billard[4] found the mucous membrane of the œsophagus, as well as that of the isthmus of the fauces, more or less congested, 190 times; no ramifying vessels could be seen, but the mucous membrane presented a uniform redness, which did not extend deeper than the epithelial layer. Billard considers that in these cases there was passive congestion due to the imperfect establishment of the relation between respiration and circulation. Indeed, autopsies made on newly-born infants show conclusively that when the circulation through the lungs, heart, or liver is obstructed, hyperæmia of the œsophagus is almost always present. In older children the same condition is brought about by morbid conditions of the blood, as in fevers and diphtheria. Even when the first months of infantile life have been safely passed through, the œsophageal veins readily become gorged in various affections of the more important organs, as well as in cases of severe general disease. Thus, Steffen[5] reports 10 cases of hyperæmia and 6 of ulceration of the mucous membrane of the œsophagus, out of 44 cases of fatal disease in infants and young children. In most of these there was circumscribed pneumonia, whilst in 2 there was enteritis, and in 2 *cholera infantum*. In some of Billard's cases, however, it would appear that the morbid changes had actually commenced before birth. The exciting cause of the complaint seems to be sore nipples or a defective quality of milk on the part of the mother or nurse, or improper food.

---

[1] Op. cit. p. 278.

[2] "Lectures on Diseases of Infants"—"Lond. Med. Journ." July 18, 1835.

[3] This is probably to be accounted for by the fact that even in children's hospitals patients under two years of age are not admitted. Within the last two years, however, a hospital has been established in Boston (U.S.) by Dr. Havens, which is exclusively devoted to infants *under* this age. Much valuable information concerning the maladies of early infancy is likely to be obtained at this institution, whilst the problem of artificial feeding will be worked out in a scientific manner hitherto impossible.

[4] Op. cit. p. 274.

[5] "Jahrb. fur Kinderheilkunde," N. F. 1869, Bd. ii.

The principal *symptom* of œsophageal inflammation in children is an unwillingness to suck. When the child, however, can be induced to take the breast it leaves off sucking after a second or two and commences crying. Most of the milk is immediately returned, quite unchanged, a very small quantity probably reaching the stomach. Gentle pressure on the lower part of the trachea will, as Billard[1] has pointed out, often make the child cry.

The *diagnosis* of this affection is very difficult. If occurring at the time of birth, it may be confounded with a congenital malformation of the œsophagus. In the latter case, however, *all* the milk is rejected, and paroxysms of suffocation are brought on by attempts to swallow. On the other hand, in the affection now under consideration, although the child cries after trying to suck, a small quantity of nutriment is retained.

The *pathological changes* vary in different cases. Sometimes the whole lining membrane is inflamed, whilst occasionally the hyperæmia affects only a limited surface. Ecchymotic patches are often present. Sometimes the inflammation goes on to *ulceration*. The ulcers vary in form and size. Thus, in one of Billard's[2] cases the upper part of the œsophagus was highly injected, and there were two sharply-cut ulcers of oblong shape, each measuring about four lines in its longest diameter. In another of Billard's[3] cases the whole of the upper third of the gullet showed erosions of the epithelium, whilst in a third instance portions of the epithelial layer were expectorated as broad yellowish shreds; on *post-mortem* examination the mucous membrane exhibited large patches of a bright red colour, which appeared to correspond with the membranous material expectorated during life. Ulcers, when present, generally affect only a limited portion of the œsophagus—the upper or lower part—and, according to Steffen,[4] their number is in inverse proportion to their size. It not unfrequently happens that the inflammatory process is confined to the follicles, the orifices of which are often slightly ulcerated, and are surrounded by red rings, which are much brighter than the general purple hue of the rest of the mucous membrane. Occasionally the disease goes on to *gangrene*, one case having been reported by Billard,[1] in which the lining membrane of the œsophagus presented large loose irregular eschars, the intervening surface being highly inflamed and traversed by deep excoriations.

---

[1] Op. cit. p. 290.

[2] Ibid. p. 276.

[3] Ibid. p. 279.

[4] Loc. cit.

The *prognosis* is generally unfavourable in these cases, not only on account of the very tender age of the patient and the extreme difficulty of carrying out suitable treatment, but because the œsophageal inflammation is so often associated with pneumonia and gastro-intestinal irritation.

In the *treatment* of this affection it is most important to pay attention to the quality of the milk and the condition of the mother's nipples; or, if artificial nutriment is used, the cooking utensils and feeding bottles should be carefully looked to. As regards medicine, the remedies found useful in thrush, such as chlorate of potash dissolved in milk, and borax mixed with honey, may be employed. Dr. Ryan[2] strongly recommended antiphlogistic remedies, such as leeching, but it must be remembered that this advice was given nearly fifty years ago, and that the views then in vogue have completely passed away. There is less objection to this author's other suggestion, viz., the application of warm fomentations to the neck.

Phlegmonous Œsophagitis.

It is exceedingly doubtful whether acute inflammation of the submucous areolar tissue ever occurs as an independent affection. It was first described by Belfrage and Hedenius,[3] as occurring in a case in which a fish-bone had become impacted in the throat, and it has since been observed in a case of poisoning by sulphuric acid, but as a rule the injury proceeds from without. Zenker and Ziemssen[4] have reported a number of cases, in most of which the morbid condition resulted from the penetration of abscesses (generally of scrofulous glands) through the external coats of the gullet. The condition is not likely to be recognized during life, and at present must be regarded as a pathological curiosity—the result of the burrowing of pus between the constituent parts of the œsophageal walls. As such it will be referred to in connection with those diseases (traumatic œsophagitis, peri-œsophageal abscess) in which it is occasionally observed after death.

---

[1] Op. cit. p. 288.

[2] Loc. cit.

[3] "Schmidt's Jahrb." Bd. clx. p. 33.

[4] "Cyclopædia of Medicine," vol. viii. p. 151, et seq. English Transl. 1878.

ULCER OF THE GULLET.

Although ulceration is present in almost every case of prolonged obstruction of the gullet, there is no conclusive evidence that it ever occurs as an independent disease. None of the cases hitherto recorded present any analogy to the "simple perforating ulcer of the stomach." When a limited surface of the latter visens is deprived of its supply of blood by embolism or through any other morbid condition, the solvent action of the gastric juice comes into operation, and an ulcer can quickly form. It need scarcely be pointed out that a lesion of this nature could occur in the gullet only under very exceptional circumstances, if at all, during life, and that the œsophageal mucous membrane can, as a rule, be acted on by the gastric juice only after death (see "Post-mortem Softening of the Gullet"). The cases of "simple ulcer of the œsophagus" which have been reported by the older writers are too incomplete to be relied upon, whilst many modern cases, nearly all of which have been carefully collected by Knott,[1] are open to the objection that the disease may have been of malignant nature, the ulcerated surface not having been submitted to the test of microscopic examination. This observation applies to a case of my own,[2] and to another of Dr. Benson.[3] Again, in other cases of so-called "simple ulceration" there is not the slightest evidence that the morbid process *commenced* in the gullet. In some of the supposed examples the disease probably originated in the trachea. Thus, in a case occurring in the practice of Dr. Gordon[1] the patient had suffered from repeated *attacks of dyspnœa a considerable time before dysphagia supervened.* In other cases,[2] in which the early history is obscure, it is quite possible that the original lesion may have been due to the temporary impaction of a foreign body, to a peri-œsophageal abscess, or even to the penetration of a scrofulous gland. In any of these instances, by the time the autopsy is made, there is often nothing which can reveal the original cause of the malady, and there is at present no ground for considering that ulceration of the œsophagus can take place as an independent process. Ulcers of the gullet may follow œsophagitis,[3] and they are certainly found in cancer, syphilis, and phthisis, as well as in thrush, diphtheria, variola, typhoid fever, and in cases of traumatic lesion.

---

[1] "Pathology of the Œsophagus." Dublin, 1878.

[2] "Trans. Path. Soc." vol. xix. p. 213.

[3] Knott : Op. cit. p. 73.

TRAUMATIC ŒSOPHAGITIS.

Latin Eq.—Œsophagitis traumatica.
French Eq.—Œsophagite traumatique.
German Eq.—Traumatische Entzündung der Speiseröhre.
Italian Eq.—Esofagite traumatica.

DEFINITION.—*Acute inflammation of the œsophagus caused by caustics or irritants,[4] giving rise, when very severe, to complete destruction of the walls of the gullet, in slighter cases to limited desquamation, and when mild to active hyperæmia.*

History.—Inflammation of the gullet from the action of caustics has been more or less known to physicians since the earliest dawn of scientific medicine, but it is only in modern times that the special effects of the various irritant and corrosive poisons on the mucous membrane of the alimentary canal have been attentively studied. Less attention has, however, been given to the action of such substances on the gullet, probably because its resisting lining membrane, its freedom from recesses, and its perpendicular direction combine to make it much less vulnerable than the mouth or stomach. A mere reference to the various ancient writers who have mentioned cases of œsophageal injury from this cause would possess but little interest. Those, however, who care to look more closely into this matter may consult a list of cases of œsophageal strictures given by Béhier,[1] many of which are the result of traumatic œsophagitis, and several typical instances may be seen in Luton's[2] article on the œsophagus. Both Casper[3] and Taylor[4] contain much valuable information on this subject.

---

[1] Knott: Op. cit. p. 68.
[2] Ibid. p. 75.
[3] See page 30.
[4] Œsophagitis set up by the impaction of foreign bodies is purposely omitted here, the condition of the gullet under those circumstances being so dependent on the nature, position, and ultimate course of the foreign body that it can be best considered in connection with the accidents which give rise to it.

[1] "Clinique Médicale." Paris, 1864, p. 113.

[2] "Nouveau Dict. de Méd. et de Chir." Paris, 1877, t. xxiv. p. 416.

[3] "Handbook of Forensic Medicine." New Syd. Soc. Transl. 1862, vol. ii. p. 55, et seq.

[4] "Principles and Practice of Medical Jurisprudence." London, 1873, vol. i. p. 211, et seq. 2nd edition.

Etiology.—The disease is nearly always caused by accidental or suicidal swallowing of corrosive poisons, or highly irritant solutions, but occasionally these fluids have been administered to young children with murderous intention.[1] Sulphuric acid, from its common employment for domestic purposes, is often used by poor and ignorant persons for suicide, better educated people generally seeking a less painful poison. Nitric acid is not very easily obtained, and is therefore not so frequently used. Accidents often occur through swallowing soap-lees, a mixture generally consisting of about three parts of caustic soda to eight of water. These strong alkaline solutions appear to be very carelessly used in some parts of Austria, for in five years Keller[2] treated no less than forty-six such cases amongst children in the Mariahilf Hospital at Vienna.

Symptoms.—The specific action of many of the poisons has already been described under "Traumatic Pharyngitis" (Vol. i. p. 101, et seq.), but a few additional remarks must be made here. In the first hours after the accident the special lesion of the œsophagus does not attract particular notice, the mouth, pharynx, and stomach being generally simultaneously involved, and all claiming attention. If a strong irritant has been swallowed, the mouth is excoriated; the surface of the tongue, when the agent is sulphuric acid, being white, and when nitric acid, yellow. In both cases the tongue is swollen, the uvula œdematous, and the pharynx greatly inflamed, and presenting numerous bleeding excoriations. If a laryngoscopic examination can be made, the epiglottis and arytenoid cartilages are seen to be red, and enormously œdematous, or not much swollen, but covered with loose dark-coloured shreds and blood-stained mucus. At a later stage of the case, however, morbid changes result, which give rise to very marked œsophageal symptoms. This remark especially applies to the weak alkaline solutions, which often produce cicatricial changes in the œsophagus, whilst the pharynx, probably owing to its greater lumen, may escape injury altogether.

---

[1] Casper ("Handbook of the Practice of Forensic Medicine," New Sydenham Soc. Transl. 1862, vol. ii. pp. 75, 78, and 84) reports three cases (Nos. 188, 191, 198) in which mothers killed their infants by administering sulphuric acid.

[2] "Œster. Zeit. für prakt. Heilkunde," Nos. 45—47, 1862.

A peculiar form of œsophageal inflammation is occasionally produced by the action of antimony, which in some cases appears to have a special action on the mucous membrane of the œsophagus even when administered in medicinal doses. There is a specimen in University College Museum (No. 1052) which is a good illustration of this. Antimony, in ordinary doses, had been given to a patient exhausted by pneumonia, and after death the mucous membrane of the epiglottis and pharynx was seen to be destroyed, and the epithelium stripped off at the upper part of the œsophagus, while at the lower extremity the mucous membrane was completely ulcerated through, the circular muscular fibres being laid bare. There were likewise some smaller patches of ulceration above this point. Vogel[1] has reported a case of poisoning by antimony in which ulcers were found in the œsophagus. Sometimes, however, the effects of the poison are shown in the production of pustules. A remarkable instance of this kind is described and figured by Laboulbène,[2] in which the pustules were found scattered throughout the gullet. The action of antimony on the œsophagus is, however, by no means uniform. Thus, in three cases of poisoning by that agent reported by Taylor,[3] in which large quantities were taken, the œsophagus is described as being uninjured in every instance, although in one of them a "burning sensation down the gullet" was complained of during life. In this instance the patient was a girl, aged sixteen, and from forty to sixty grains of antimony had been taken, whilst in the other cases, occurring in young children, ten grains of the poison had been swallowed.

In briefly describing the effects of poisoning by phosphorus in the article "Traumatic Pharyngitis" (Vol. i. p. 103), I omitted to mention two very characteristic symptoms, viz., the belching forth of bluish-white fumes luminous in the dark, and the evacuation of primrose-coloured stools.[1]

---

[1] "Lehrbuch der Kinderkrankheiten," p. 99.

[2] Op. cit. p. 87.

[3] Op. cit. vol. i. pp. 309, 310.

In cases of injury by irritants the symptoms depend on the strength of the poison. When the mineral acids, chloride of zinc, ammonia, or some other solutions in a concentrated state, are swallowed, they *corrode* the mucous membrane, and give rise to the most serious and painful symptoms, whilst the dilute acids and weak alkaline solutions set up *acute*, or, in some cases, only *sub-acute inflammation.*

Immediately after swallowing a *powerful corrosive poison*, or strong caustic, the patient experiences a burning sensation in the fauces and stomach, or he may complain of an agonizing pain at the root of the neck or between the shoulders. In some of the most severe cases, however, in which both the stomach and œsophagus are deeply corroded, the sensibility seems to be blunted, and but little pain is complained of. This probably results from extreme shock to the system. The patient expectorates and vomits either dark-coloured fluid or a frothy secretion containing blood and shreds of membrane. The vomiting may continue for two or three days, but occasionally, in the most severe cases, it ceases altogether after three or four hours, and notwithstanding this apparently favourable turn the patient may succumb within a short time. If the larynx is implicated, there is extreme difficulty of breathing, together with troublesome cough. There is usually very great prostration, the pulse being quick and small, and the skin bathed in perspiration. Sometimes, however, there is active vascular excitement, the skin is hot and dry, the pulse hard and quick, and as the result of cerebral irritation, or possibly of some form of intoxication produced by the poison, the patient is very restless, or even delirious. Most patients suffer from distressing thirst, and if they survive there is nearly always obstinate constipation.

In *less severe* cases, when the mineral poisons have been taken in a diluted form, the symptoms are comparatively slight, and resemble those described under "Acute Œsophagitis" (pp. 28, 29)—that is to say, there are inability to swallow and constant expectoration of glairy fluid. The characteristic anxious expression is also present in the countenance.

---

[1] I am indebted to the editor of the "Birmingham Medical Review" (Oct. 1880) for calling my attention to these omissions, and also for a very kind and critical review containing other valuable suggestions.

The patient complains of a burning acid, or of an acrid alkaline taste, according to the chemical nature of the poison. In these apparently mild cases, however, the dangerous symptom of progressive dysphagia may show itself at a later stage.

Pathology.—The morbid changes, of course, depend on the nature and degree of concentration of the poison. In *severe* cases the gullet as a whole may be gangrenous, its walls here and there being even completely perforated by deep ulcers. In these instances the tongue, pharynx, and larynx are almost always extensively implicated in the destructive process. According to Casper,[1] in cases of poisoning by corrosive or irritant substances, "the œsophagus is only in the rarest instances carbonized like the stomach; generally it is only hard to cut as if tanned, and of a grey colour, and the vascular injection of its mucous membrane may still be recognized." The tissues of the gullet are in fact quite firm, the mucous membrane is grey, and has an acid reaction. In poisoning by corrosive sublimate, the mucous membrane of the mouth, pharynx, and œsophagus generally has a violet tint, but sometimes it is whitish.

When the corrosive action has been less violent, the lining membrane of the œsophagus is of a brownish or ashen colour, whilst its longitudinal ridges are partially corroded, and more or less detached.

In the *milder* cases the mucous membrane is extremely hyperæmic and highly succulent, whilst there is abundant cell-proliferation; but it is only in cases where the injury kills through the severity of the gastric affection, whilst the œsophagus remains comparatively unscathed, that these slight pathological changes can be studied.

It is worthy of note that in some instances the stomach may be seriously injured, whilst the œsophagus altogether escapes the corrosive action of the poison.[2]

Diagnosis.—It is very seldom that any difficulty in diagnosis can arise, the *immediate* occurrence of the symptoms on swallowing the poison leaving no doubt as to the nature of the affection. Casper,[3] however, points out that in infants it is very important to distinguish between the state of the tongue in poisoning by sulphuric acid and that occurring in thrush.

It is necessary to ascertain, if possible, the nature of the poison that has been taken. If the patient is insensible when the surgeon arrives, and the character of the poison is unknown, the bottles, vials, and vessels in the room should be examined, with the view of discovering some remains of the acrid fluid. If this does not supply the desired information the vomited matters should be tested. Should it happen, however, that the patient has not been sick, emetics should be administered. The use of the stomach-pump, though constantly recommended by surgical writers, is in these cases attended with great risk, as the point of the instrument is extremely likely to be pushed through the walls of the œsophagus.

---

[1] Op. cit. vol. ii. p. 57.

[2] "Lancet," Nov. 6, 1880.

[3] Op. cit. vol. ii. p. 57.

It is only in dealing with the *sequelæ* of the accident that there can be any doubt as to the nature of the original lesion. Thus, a patient suffering from a stricture brought about by a corrosive poison taken with suicidal intent, is sometimes ashamed to confess the origin of the condition; and in these cases the question of diagnosis between cicatricial stricture and malignant disease may arise. This subject will be fully considered in the article on "Cicatricial Stricture of the Œsophagus."

Prognosis.—The prognosis must depend on the amount and degree of concentration of the corrosive poison that has been swallowed, and also on the extent to which adjacent parts are implicated. In severe cases the absence of pain must be looked upon as a very unfavourable sign. Vomiting of dark-brown fluid and of membranous shreds, and extreme prostration are generally indications of an early death; but even in less severe cases it must not be forgotten that stricture is exceedingly likely to supervene. It may be added that though this may be cured for the time, it is almost certain to recur, and that patients who have once suffered from traumatic stricture are afflicted with an infirmity which will probably exist all the rest of their life.

Treatment.—Acids should always be neutralized by the administration of alkalies largely diluted in water, barley-water, or milk. Carbonate of soda, potash, and magnesia are the best remedies, but any alkali that can be obtained, such as chalk, whiting, or even the scrapings from a whitewashed ceiling, should be at once administered. Sal volatile is generally at hand and can be given freely diluted.

In the case of poisoning by phosphorus, carbonate of magnesia should be given in drachm doses every fifteen minutes till the breath ceases to be phosphorescent.

If the poison has been an alkali, acids should *not* be used, as they increase the inflammation, but oil or melted butter should be given. Hot poultices should be applied over the lower part of the neck and to the back along the course of the gullet. The thirst must be assuaged by iced drinks. Very little food, and that only of the blandest character, should be allowed to be taken by the mouth, but the patient should be fed from the very outset by nutritive enemata, and anodynes should be given subcutaneously. Should the patient recover from the immediate effects of the injury, prompt and persevering measures must be adopted to prevent the obliteration of the canal by cicatricial contraction.

As cases of corrosive poisoning are so common, and nearly every pathological museum in London contains specimens of the accident, I do not think it necessary to append any examples.

It may not be out of place to mention that *traumatic œsophagitis* occasionally arises from the stings of insects accidentally swallowed. In these cases the inflammation develops suddenly; there is extreme odynphagia, as well as a burning pain at the seat of the sting. The patient is generally very prostrate and alarmed. If able to swallow at all he should be induced to take a weak alkaline solution, which generally gives immediate relief. Should the pain be severe, morphia must be administered hypodermically. In a case related by Ranse[1] the sting was quickly followed by a swelling in the neck corresponding to the supposed site of the sting in the gullet, just below the thyroid gland on the right side, and by an urticaria-like eruption which affected the body generally, but was most marked on the side of the neck near the same point. The following case occurred in my own practice :—

In August, 1877, a gentleman, aged fifty-four, whilst drinking some beer suddenly felt a very sharp pain in the gullet at a point corresponding to the episternal notch. This was followed by repeated severe paroxysms of coughing, and at length by vomiting. It was not till the contents of the stomach were brought up and a wasp seen that the nature of the injury was guessed. I saw the patient about three hours after he was stung, and he was then very anxious and rather faint, and complained of something lodging in the throat just above the level of the sternum. The pharynx and orifice of the larynx were seen to be free from congestion. I endeavoured to administer a weak solution of ammonia, but the patient could not swallow it. I then gave morphia hypodermically. In the evening the patient felt pretty well, but still could not swallow. The next day he could take liquids but not solids, and deglutition was not fully re-established till nine days after the sting.

---

[1] "Gaz. Méd. de Paris." Sept. 1875.

CHRONIC ŒSOPHAGITIS.

Latin Eq.—Œsophagitis chronica.
French Eq.—Œsophagite chronique.
German Eq.—Chronische Entzündung der Speiseröhre.
Italian Eq.—Esofagite cronica.

Definition.—*Chronic inflammation of the lining membrane of the œsophagus, giving rise to dysphagia and occasionally leading to ulceration.*

Etiology.—The observations with regard to the comparative rarity of acute inflammation of the œsophagus (see page 27), apply also to the chronic form of the disease. Many cases of chronic œsophagitis are probably often regarded as examples of gastric irritation, and treated as dyspepsia, which, as will be hereafter shown, occasionally causes, and frequently follows, slight œsophageal inflammation. It is extremely probable, and the point has been insisted on by several writers, that the long-continued abuse of ardent spirits is a frequent source of chronic œsophageal inflammation. Daily experience proves that excessive indulgence in the stronger forms of alcohol irritates and inflames both the pharynx and the stomach; and though the œsophagus possesses greater powers of resistance than either of these parts, it is not likely that it enjoys absolute immunity. The complaint has been attributed to chewing tobacco, but there is no positive evidence on the subject.

Habitual vomiting may sometimes produce the affection, and according to Cornil and Ranvier,[1] it is occasionally brought about by pyrosis. The disease probably sometimes commences in a slight accidental injury such as may be caused by swallowing a hard or pointed substance, or it may arise from taking food either too hot, or of too pungent a character.

It is generally asserted that the disease often follows the acute form of inflammation of the œsophagus, and from the analogy of most disorders of inflammatory nature such a sequence might reasonably be looked for. There is not, however, a single case on record which supports this view, and my own experience, which, though very limited as regards this complaint, is large in relation to the number of published cases, is altogether opposed to the theory that the chronic affection often originates in an acute attack. I have met with one instance in which the disease followed an attack of pleurisy, the pleural inflammation being very localized, and affecting the base of the left lung near the posterior mediastinum. In this case, as the pleura got well the œsophagus became affected, a slight degree of inflammation being set up which lasted for nearly three months. Though acute œsophagitis is comparatively common in infants, the chronic form of the disease appears to be confined to adults. I have never met with it under twenty-five years of age, and most of my patients have been over forty.

---

[1] "Manuel d'Histologie Pathologique." Paris, 1869, p. 769.

As a secondary phenomenon the condition is occasionally seen in phthisis, and when syphilitic ulceration of the gullet occurs, there is no doubt always some associated inflammatory action. In stricture of the œsophagus likewise, whether arising from cancer, syphilis, or injury, chronic inflammation is always present. This is brought about by the irritation of food (often undergoing fermentative changes), which lodges above the stricture, and sometimes probably by the passage of bougies.

Symptoms.—The symptoms of the affection are obscure when the disease is slight, and it is only in rather severe and protracted cases that it can be distinctly recognized. The most marked symptom is discomfort or even pain in swallowing. Solids sometimes cannot be taken at all, whilst liquids cause considerable inconvenience. The act of swallowing is always performed very slowly. In most of the cases that have come under my notice the inflammation appeared to be at the upper part of the gullet, but I have met with one in which it was in the lower third. There is generally a good deal of expectoration of viscid mucus, but sometimes the sputa are frothy and closely resemble ordinary saliva. There is never such an abundant flow as is met with in acute œsophagitis.

Pyrosis and hiccough are described by most writers as being present, but I have not observed them in any of the uncomplicated cases which have come under my notice. Occasionally chronic œsophagitis follows chronic gastric catarrh, and the two diseases may coexist for a long time. Again, as the existence of chronic œsophagitis compels patients to subsist for a long time almost entirely on liquids, dyspepsia not infrequently follows. Whether the irritation of the stomach be primary or secondary, when once it is established, pyrosis is nearly sure to ensue, and in my opinion must be looked upon as a gastric symptom. In these cases, in addition to the purely œsophageal troubles, gastric pain, flatulent distension of the abdomen and costiveness are present, whilst headache and depression of spirits are also complained of.

On auscultating the œsophagus, the descent of the alimentary bolus can generally be perceived to be delayed, whilst if the surface of the mucous membrane be roughened, a loud harsh noise may be heard accompanying each act of deglutition. When there is much obstruction, air-bubbles, and sometimes perhaps the "morsel" itself, can be heard to ascend. Exploration with the bougie should on no account be attempted, as this is likely to aggravate the mischief.

The disease undergoes a good deal of variation, getting better and worse without any assignable cause; but a marked tendency to recurrence after any degree of improvement is one of its most characteristic features.

Pathology.—The morbid changes that take place have not hitherto been investigated, for the disease of itself, though causing much inconvenience, never terminates fatally. It is only in cases of cancerous obstruction and stricture, that the pathological changes of chronic inflammation of the œsophagus can be studied. In these cases, at a considerable distance from the morbid growth, the vessels are seen to be enlarged and tortuous, whilst the mucous membrane is irregularly thickened, and often presents numerous ulcers which vary greatly both in size and depth. They are very frequently of a narrow oval form, and as the œsophageal glandulæ are arranged in short longitudinal rows, it is probable that many of these ulcers are of *follicular origin.* There is often considerable proliferation of the areolar tissue beneath and around the ulcerated surface.

Diagnosis.—The disease with which this complaint is most likely to be confounded is spasm of the œsophagus, in which affection there is, probably, always considerable hyperæmia of the mucous membrane. In chronic inflammation, however, the difficulty of swallowing is *constant*, whilst in spasm it varies to some extent from day to day, and even from meal to meal. The most important point of distinction, however, between these two affections is that whilst in spasm solids or semi-solids can often be swallowed with comparative ease, in simple chronic inflammation liquids pass down much more readily.

Chronic œsophagitis may be confounded with laryngeal disease in which implication of the epiglottis or arytenoid cartilages has given rise to dysphagia. In these cases the laryngoscope furnishes a means of diagnosis, but it must always be remembered that the two affections may coexist—the œsophageal malady being generally secondary.

The symptoms of incipient cancer are very like those of inflammation, but the former affection is mostly a disease incidental to the decline of life; in persons of middle age the progress of the case can alone enable the surgeon to distinguish between the two conditions.

Prognosis.—There does not appear to be any danger to life from this disease, but it is extremely apt to recur, and any attack may be of long duration.

Treatment.—The most important feature in treatment is the avoidance of anything that can irritate the mucous membrane. The diet must be confined to soft or liquid food. A bismuth pastil (Throat Hosp. Phar.) taken every half-hour or hour, often seems to soothe the mucous membrane; and when the disease is beginning to pass away, lozenges of rhatany, kino, or tannin are now and then of use. Swallowing small particles of ice sometimes gives relief, but occasionally warm mucilaginous drinks are more soothing. There are cases, however, in which all remedies appear to act prejudicially, the most important indication seeming to be the maintenance of the œsophagus as far as possible in a state of rest. If anodynes are required, they should, as a rule, be administered hypodermically. In some cases I have found counter-irritation by means of mustard poultices, blisters, or croton oil of considerable use. Hot foot-baths, as recommended in acute œsophagitis, sometimes act beneficially.

CASES ILLUSTRATING CHRONIC ŒSOPHAGITIS.

Case 1.—C. S., a butcher, aged forty-seven, applied at the Throat Hospital on January 14, 1874, complaining of difficulty of swallowing, and pain over the episternal notch. He stated that up to that time he had enjoyed good health, although he had been accustomed to drink rather freely. He had latterly noticed a slightly increased flow of saliva. The laryngoscope showed the upper part of the throat to be healthy; on auscultation, great slowness in the act of deglutition was perceived, but there was no special roughness nor apparent obstruction at any one spot. A bougie could not be passed beyond the upper third of the œsophagus. The patient complained very much of the use of the instrument, and spat up about a teaspoonful of blood immediately after it was withdrawn. The next day difficulty in swallowing had slightly increased. He was put upon iodide of potassium, and no food but milk and beef-tea was allowed. A week later he had slightly improved, but alleged that the iodide of potassium caused such a constant disagreeable taste in his mouth that he was unable to take food. The medicine was accordingly discontinued. In a few days the patient appeared a little better, the pain in the neck being less, and he stated that he had eaten some bread and milk. The probable inflammatory nature of the disease was now first recognized, and the patient was persuaded to become a "teetotaller." He was given bismuth mixture, and ordered to discontinue crying out the price of food, inviting customers, &c., after the manner of butchers in the poorer quarters of London. At the end of March the man was quite cured, and was able to eat and drink anything without difficulty. In February, 1876, this patient had a second attack, which, however, was of milder character, and entirely passed off in three weeks.

Case 2.—Mr. T. S., a farmer, aged twenty-nine, consulted me on November 11, 1876, on account of difficulty of swallowing. He stated that until recently he had been a strong healthy man, and had always been temperate. In addition to the dysphagia there was slight odynphagia, besides an increased flow of saliva and pain between the shoulders. The affection had come on gradually about three months previously; the patient had neither pyrosis, sickness, nor any other symptom of indigestion. Examination with the laryngoscope showed the larynx and pharynx to be healthy. On auscultation of the gullet, slowness in swallowing and decided obstruction opposite the fifth dorsal vertebra were plainly perceived. An attempt to pass a bougie failed, the point of arrest appearing to be at the orifice of the œsophagus—much higher than auscultation had indicated. [The difficulty was probably caused by spasm, but the patient refused to permit an examination under an anæsthetic.] On November 12, the day following the attempt to pass the bougie, the patient was unable to swallow at all, and he became very much alarmed. A hypodermic injection of morphia was given at 8 p.m., and after a good night he was able to swallow nearly as well as on the 11th. In the course of a few weeks he quite recovered.

VARICOSE VEINS OF THE GULLET.

Latin Eq.—Varices œsophagi.
French Eq.—Varices œsophagiennes.
German Eq.—Varicositäten der Speiseröhre.
Italian Eq.—Vene varicose del esofago.

DEFINITION.—*Enlarged veins at the lower part and occasionally at the middle third of the œsophagus, generally* *resulting from some obstruction of the portal circulation, occasionally rupturing and giving rise to hæmatemesis.*

History.—Hæmorrhage from the gullet was recognized by Galen,[1] but after his time there is no allusion to the subject till the early years of the present century, when a varicose condition of the œsophageal veins was mentioned by Portal[2] as sometimes giving rise to hæmoptysis. It was not till 1820, however, that Peter Frank,[3] pointed out the connection existing between gastric hæmorrhage and obstruction of the portal circulation, and thus paved the way for the elucidation of œsophageal bleeding. In 1840, Rokitansky[4] published an instance of fatal hæmorrhage from enlarged œsophageal veins. In 1853, Gubler,[5] in comparing the loss of blood from enlarged hæmorrhoidal vessels with some forms of hæmatemesis, called attention to the analogy in the distribution of the veins at each end of the digestive tract, and described the peculiar arrangement of the veins at the lower part of the gullet. In 1858, Fauvel's[6] case (which had been observed in 1837 and referred to by Gubler in the work just cited) was published together with one by Lediberder. In the following year Bristowe[7] related a case, and in 1874 an example was published by Ebstein.[8] Since then, Audibert[9] and Dusaussay[10] have treated the subject in short monographs, and Duret[11] has given a clear account of the anatomical conditions leading to the development of the affection. Zenker[12] has devoted to it a few pages of his valuable article on the œsophagus, and quite recently Eberth[13] and Hadden[14] have described instances of the complaint.

[1] "De locis affectis," lib. v. cap. iv.
[2] "Cours d'Anat. Méd." Paris an xii. (1803) t. iv. p. 539.
[3] "Traité de Méd. Prat." t. iii. p. 245.
[4] "Med. Jahrb. d. Œsterr. Staates." 1840, Bd. xxi. p. 230.
[5] "De la Cirrhose." Paris, 1853, p. 62.
[6] "Recueil des Travaux de la Soc. Méd. d'Observ." 1858, fasc. iii. p. 257.
[7] "Trans. Path. Soc." London, 1859.
[8] "Schmidt's Jahrb." 1874, clxiv. p. 160.
[9] "Des Varices Œsophagiennes." Thèse de Paris, 1874.
[10] "Etude sur les Varices de l'Œsophage." Thèse de Paris, 1877.
[11] "Progrès Médical," t. v. 1877, p. 304.
[12] "Ziemssen's Cyclopædia," vol. viii. p. 130, et seq.
[13] "Deutsches Archiv. für Klin. Med." 1880, vol. xxvii. p. 566.
[14] "Trans. Path. Soc." London, 1882, vol. xxxiii. p. 190.

Etiology.—According to Galen,[1] hæmorrhage may take place from the œsophagus, "ob solam sanguinis plenitudinem," but this theory is not likely to meet with acceptance in the present day. Cirrhosis of the liver has generally been considered to be the cause of this affection, but any hepatic disease which obstructs the portal circulation is apt to produce it, and it would appear from Zenker's[2] statistics that the affection occurs with relatively greater frequency in senile atrophy than in cirrhosis. Thus, in 178 cases in which there was advanced chronic (especially senile) atrophy of the liver, œsophageal varices were found forty-three times or in

---

[1] "De locis affectis," lib. v. cap. iv. sub fin.
[2] Op. cit. vol. viii. p. 132.

24 per cent., whilst the varicose condition was present only once, *i.e.*, 5½ per cent., in 18 cases of cirrhosis. In Bristowe's case there was considerable enlargement of the spleen, but the liver was normal. The condition of the portal vein, however, is not described. It must not be forgotten, as Zenker very properly points out, that senile atrophy of the liver is a disease of old age, a period of life at which varices are most apt to occur, and hence that the dilated state of the œsophageal veins must not be regarded as necessarily due to hepatic obstruction. Zenker unfortunately does not mention to what extent varices were present in other parts of the body in his 178 cases. Klebs[1] has met with instances in which the affection was due to syphilitic disease of the liver, and König[2] states that he has also seen a case in which "fatal hæmorrhage took place from a varix in the neighbourhood of the cardia in a patient suffering from syphilitic hepatitis." As Gubler and Monneret[3] have indicated, there is a tendency to loss of blood from various parts when the liver is diseased. Indeed, even as far back as the time of Hippocrates epistaxis in adults has been considered to be a frequent concomitant of chronic hepatic disease. This no doubt depends on some morbid alteration in the condition of the blood. In the gullet, however, the peculiar relation of the veins at its lower part to the general circulation on the one hand and to the portal system on the other, favours the development of the affection. For, as Gubler remarks, there is towards the cardiac orifice of the stomach a neutral territory, in which two sets of veins meet each other—one set being radicles of the vena azygos, and thus communicating with the general circulation, whilst the others end in the portal vein through the coronary branch of the stomach. This arrangement probably tends to cause obstruction to the circulation where the two currents meet; and Gubler[4] points out that at the lower part of the rectum, where there is an analogous communication between the systemic and portal veins, hæmorrhoids are very common as the result of obstruction.

An additional factor in the causation of these varices is, according to Duret,[5] the relatively large capacity of the œsophageal plexuses as compared with the size of the thoracic veins with which they communicate. Hence, if anything prevents the former from emptying themselves into the coronary veins of the stomach, the blood is necessarily driven back, and the outflow into the bronchial, azygos, and phrenic vessels not being sufficiently free, retardation of the current is produced, the œsophageal plexuses become distended, and, if the cause continues, varix results. Paul Bert[1] has shown that each act of inspiration tends to increase the quantity of blood in the thoracic veins; it can, therefore, easily be understood that when, owing to the conditions which have just been described, these vessels are already over full, bodily effort or any other influence causing increased frequency of breathing favours the production of varix, or even rupture.

---

[1] "Hand. der pathol. Anat." 1868, Bd. i. p. 162.

[2] "Deutsche Chirurgie" v. Billroth u. Lücke.—"Krankheiten des Pharynx und Œsophagus," p. 30.

[3] Gubler: Op. cit. p. 69.

[4] Op. cit. p. 62.

[5] "Progrès Médical." 1877, t. v. p. 306.

It is possible, also, that, owing to the vertical position of the gullet, gravitation may play some part in the production of varicose veins, in the same way as it does in the legs.

Symptoms.—Occasional haematemesis occurring in elderly people in whom there is reason to suspect disease of the liver, kidney, or spleen, is suggestive of the existence of varicose veins of the gullet. It is seldom, however, that the disease can be recognized with certainty during life except by the aid of the œsophagoscope, and even with this instrument it is often impossible to detect the enlarged veins, which may be altogether at the lower part of the gullet. In one of the two cases I have met with, however, I succeeded in seeing the dilated veins during life. In both cases the patients complained of an uneasy sensation in the throat, and in one of them constant hiccough was a marked feature; but as the patient was a confirmed drunkard, this symptom has no special significance as regards the complaint now under consideration. In some of the recorded instances pain has been complained of in the region of the stomach. The evacuations are sometimes distinctly bloody, but more often tarry in appearance. More rarely the stools are of natural appearance.

Diagnosis.—It is extremely difficult to determine with certainty during life that the disease exists, except in the rare cases in which the desired information can be got by œsophagoscopy. Even in these cases it is not unlikely that the veins of the stomach may also be affected in a similar manner, and that the source of the bleeding may be there.

---

[1] Quoted by Duret: Loc. cit.

Hæmorrhage caused by the rupture of varicose veins has likewise to be distinguished from that arising from other local conditions. Although none of these has any absolutely characteristic feature by which it can be identified, some special points may be indicated by which the cause of the bleeding may sometimes be recognized. Thus the hæmorrhage from perforation by an aneurism is excessively profuse, whilst in bleeding due to the pressure of a solid tumour or to ulceration, whether malignant or specific, there is a history of pre-existent severe dysphagia. In the case of foreign bodies, the occurrence of the accident is usually known.

Pathology.—The general pathology of the disease has already been described in dealing with the etiology, and it only remains to make some remarks on the local condition. It is probable that the œsophageal veins are more frequently dilated than is generally supposed, for out of eighteen gullets taken altogether at random, in seven I found more or less dilatation of the submucous veins, whilst there was distinct, although slight, varix in two cases. In four instances the enlargement was above the middle of the tube, in three it was at the lower end, and in one both the upper and lower portions of the gullet were affected, the intervening surface, to the extent of four inches, being normal in appearance. In all the cases the enlargement was most conspicuous on the front wall of the gullet, and varied in degree from well-marked arborescence of engorged venules to black, bead-like prominences, connected with vessels of about the size of the angular vein of the face. Although they were not examined microscopically, it seems certain that these nævoid points were true vascular expansions and not ecchymotic patches, for they could neither be washed nor scraped off. It may be remarked that the mucous membrane itself was perfectly free from redness, although until it was stripped off it appeared coloured by the enlarged underlying vessels. It may be added that, so far as was known, none of the subjects from whom the specimens were taken had shown any sign of œsophageal trouble during life.

In Eberth's[1] case there was chronic catarrh of the intestinal mucous membrane, and he thought that this condition had led to general phlebectasis of the chylopoietic viscera. Not only was the rectum the seat of large hæmorrhoids, but the vessels of the liver were in many parts much dilated, and at one spot formed a true erectile tumour. The coats of the collapsed œsophageal vein, from which the bleeding had taken place, were extremely attenuated, and the vessel itself was so superficial in situation that to the naked eye it appeared to be lying quite bare of any mucous covering.

---

[1] Loc. cit.

Treatment.—There is but little to be done in the way of cure, though the hæmorrhage can generally be arrested by making the patient swallow a strong styptic. Among remedies of this kind the mixture of tannic and gallic acids contained in the Throat Hospital Pharmacopœia, under the name of Gargarisma Acidi Tannici fort., is probably the most effectual. Treatment is of little avail as regards the varicose condition of the vessels, and it is seldom that the hepatic disease upon which it depends can be relieved.

CASES ILLUSTRATING VARICOSE VEINS OF THE GULLET.

Case 1.—Mr. H. B., aged fifty-nine, consulted me in January, 1875, on account of a constant uneasy sensation in the throat, and occasional attacks of spitting of blood. The patient was an exceedingly stout man, of dull grey complexion, and of a generally unhealthy appearance. Though seldom drinking to intoxication he had freely partaken of spirits for the last forty years. He stated that he had been quite well till two years before, when he had had slight jaundice. Since then he had attacks at intervals, but they had generally not lasted more than a few days. Since the commencement of his illness he had occasionally had rather severe feverish colds, accompanied by pain over the liver. Six months after he first became ill he had severe bleeding from the nose, which broke out at intervals during a week, and was at last arrested only with the greatest difficulty. On physical examination, owing to the extreme obesity of the patient, it was very difficult to make out the limits of the liver. The heart sounds seemed very feeble, but no murmur or other evidence of disease could be detected. Examination of the throat showed that the pharynx was much relaxed, the uvula elongated, and the mucous membrane of the larynx slightly congested. On February 7 I was summoned to see Mr. B. on account of what was called "spitting of blood," but on arriving I found that the hæmorrhage occurred in a gush with slight retching, and was clearly of the nature of hæmatemesis. There had been three gushes of blood, amounting in the aggregate to eleven and a half ounces. I directed the patient to swallow a small quantity of the Garg. Acid. Tannic. fort. of the Throat Hospital Pharmacopœia, and no more hæmorrhage occurred on that occasion. The patient, however, was greatly weakened by the loss of blood, and a few days later had a severe attack of diarrhœa. Two subsequent bleedings from the throat took place in March and April, and at the beginning of May the patient was attacked with bronchitis and died in a few days. The following are the notes of the autopsy which was made by Mr. Poyntz Wright thirty-six hours after death. Rigor mortis not perceptible; subcutaneous tissue loaded with fat; lungs very œdematous in the lower third, especially at posterior part; mucous membrane of bronchial tubes bright red and covered with frothy mucus; left lobe of liver much reduced in size, right lobe slightly smaller than normal; surface hob-nailed; substance hard and dry on section. Numerous ecchymotic spots were seen beneath the lining membrane of the stomach, one being as large as a penny, but most of them much smaller. On opening the œsophagus the veins at its lower part were seen to be enormously enlarged. Six large veins with free anastomoses ascended for about two inches, whilst two of these reached considerably above the middle third of the tube. Three small hard whitish vertical cicatrices were seen three-quarters of an inch above the cardia, and one larger and redder cicatrix three inches from that point.

Case 2.—Mr. M., a hotel keeper, aged fifty-one, was sent to me in October, 1880, by Dr. Robert Cross, of Craven Street. The patient, who had been a free liver, complained of a disagreeable sensation in the throat, with a constant feeling of sickness and frequent hiccough. Examination of the throat showed great relaxation of the mucous membrane of the pharynx and larynx, and elongation of the uvula. A portion of it was subsequently removed, with considerable relief to the symptoms. After about two months, however, the patient began to experience slight difficulty in swallowing. On examination with the œsophagoscope a dark round tumour about the size of a pea, with a black streak passing into it both above and below, was seen, rather below the middle of the œsophagus, and I had little doubt but that this object was an enlarged vein. As the examination was exceedingly disagreeable, the patient would not submit to a second exploration. Nevertheless, I felt justified in writing to Dr. Cross, expressing my opinion that the patient had varicose veins of the gullet, and that hæmorrhage was likely to occur. Up to this time it must be observed there had not been the slightest sign of hæmorrhage. A month later my prediction was verified, for a sudden attack of hæmatemesis came on. This was repeated on several occasions, but though a large quantity of blood was brought up, the stools had only once a tarry character. This fact makes it almost certain that the bleeding came from the gullet and not from the stomach. In August, 1881, after a severe outburst of hæmorrhage, a fatal attack of *delirium tremens* supervened. No post-mortem examination was allowed.

PERI-ŒSOPHAGEAL ABSCESS.[1]

(SYNONYMS: POST-ŒSOPHAGEAL ABSCESS. RETRO-ŒSOPHAGEAL ABSCESS.)

Latin Eq.—Abscessus peri-œsophageus.
French Eq.—Abcès péri-œsophagien.
German Eq.—Periœsophagealabscess.
Italian Eq.—Ascesso peri-esofageo.

DEFINITION.—*An inflammatory swelling containing pus, generally originating in the lymphatic glands adjoining the*

---

[1] Although the term "*post-pharyngeal abscess*" is an appropriate one, as abscesses frequently form behind the back wall of the pharynx,

œsophagus, but sometimes commencing in the areolar tissue, and more rarely induced by caries of the vertebræ. In adults the abscess occasionally penetrates the muscular coat, and gives rise to diffuse suppurative inflammation of the submucous areolar tissue, and as a still rarer sequel, a cicatricial diverticulum of the œsophagus may result.

History.—It has been already pointed out that it is useless to attempt to separate into two classes abscesses which are formed in the neighbourhood of the pharynx, and those developed in immediate proximity to the gullet. The older writers made no such distinction, and accordingly in an historical retrospect it will be convenient to treat the whole subject together. The first notice of abscess in the pharyngo-œsophageal region dates as far back as in the second century of the Christian era, when Galen[1] related a case which had occurred in his own experience, and which terminated in spontaneous rupture. From his manner of alluding to the case it would appear that he had seen several examples of the same kind, most of which had ended fatally. No mention of the complaint was made by any other writer, so far as I am aware, till the middle of the 18th century, when we meet with Morgagni's[2] careful description of a case in which an abscess pressing on the œsophagus and trachea caused the patient's death by opening into the latter tube. In 1785 Bleuland[3] mentioned that his master, Van Doeveren, had seen a fatal instance of the disease at Groningen. In 1819 Abercrombie[4] reported three cases of retro-pharyngeal abscess which he had met with in young children, and he seems to have been the first physician who recognized the idiopathic character of the affection. He was under the impression that the disease had never before been described, and he mistook his first case for croup. Sir Astley Cooper[5] refers to two examples which he had seen in adults, the dissection of the first leading him to the diagnosis and successful treatment of the second. In 1839 Petrunti[6] published a case which he cured by making an incision into the œsophagus. In 1840 Fleming[7] described the affection with considerable detail

[1] "De locis affect," lib. v. cap. iv.

[2] "De sedibus et causis morb." tom. ii. lib. xv. art. xv.

[3] "Observ. anat. med. de saná et morbosâ œsophagi struct." Lugd. Batav. 1785.

[4] "Edin. Med. and Surg. Journal," vol. xv. p. 259, et seq.

[5] "Princ. and Pract. of Surgery." Ed. by A. Lee. 1836, vol. i. p. 79.

[6] "Gazette Médicale," 2e série, t. vii. p. 122.

[7] "Dublin Journ. of Med. Science," vol. xvii. p. 41, et seq.

---

the expression "*post-œsophageal abscess*" is less accurate, inasmuch as purulent collections in proximity to the œsophagus are quite as often at the side of the tube, or even in front of it, as behind it. It is true that for practical purposes there is no difference between an abscess behind the *lower part of the pharynx* and one behind the *upper part of the œsophagus*; but there is a very wide difference between an abscess on a level with the hyoid bone, and another occurring some inches below the level of the cricoid cartilage. In point of fact, the pharynx is so broad, and extends laterally so far into the neck, that an abscess situated at one side of it practically becomes a *cervical* abscess, and is generally very properly treated as such.

as it occurs in the upper part of the neck, reporting three cases which had come under his own notice, and giving a drawing of an instrument devised by himself for the safe opening of such abscesses. In 1841 Ballot[1] described a case of abscess in close relation to the gullet. Mondière[2] followed in 1842 with a collection of cases gathered from many sources, and a year later Duparcque[3] made some interesting observations on the subject. More recently Caulet,[4] Gillette,[5] and Gautier,[6] have contributed to the literature of the disease.

[1] "Arch. Gén. de Méd." 3e série, t. xii. p. 257, et seq.
[2] "L'Expérience." Jan. and Feb. 1842.
[3] "Gaz. des Hôpitaux." 1843, p. 105.
[4] "De la Péri-œsophagite." Paris, 1864.
[5] "Des Abcès pharyngiens." Paris, 1867.
[6] "Des Abcès rétropharyngiens." Genève et Bâle, 1869.

Etiology.—Peri-œsophageal abscess, regarded as a distinct disease, probably nearly always commences in the glands in the neighbourhood of the gullet, though, in some instances, it may possibly originate in the areolar tissue. In some rare cases it appears to have its starting point in a distinct tubercular deposit.[1] As an occasional feature accompanying caries of the vertebræ, it is also sometimes met with, but this form of abscess need only be referred to in connection with diagnosis, its treatment coming within the province of the orthopædist or general surgeon. The glandular inflammation may be either *primary* or *secondary*—that is to say, it may occur in a child previously apparently healthy, or it may be developed in the course of an eruptive fever. The special predisposition to glandular inflammation in young subjects is too well known to require comment. It has been suggested that the irritation of the glands in these cases takes its rise from difficult dentition,[2] and I have no doubt that it is sometimes also connected with post-nasal disease, *e.g.*, chronic catarrh, or adenoid vegetations. According to Barthez and Rilliet,[3] abscesses in connection with the upper part of the food-tract are most frequently met with in the four earliest years of life, especially in the first. The cause of the disease is, however, often obscure, and in one of Petrunti's[4] cases the origin was attributed to "catching cold." Though the affection is often met with in infants, early life as compared with adult age does not exhibit that preponderating frequency which is seen in the case of the similar abscesses involving the pharynx. Occasionally the malady is distinctly pyæmic in

[1] Laboulbène: "Anat. Pathol." Paris, 1879, p. 89.
[2] Fleming: Loc. cit. p. 41.
[3] "Maladies des Enfants." Paris, 1853, 2nd ed. t. i. p. 243.
[4] Loc. cit.

character. Thus there is a case in Guy's Hospital Museum in which purulent inflammation following amputation of the arm extended through the axilla to the root of the neck, and gave rise to a peri-œsophageal abscess which ultimately involved all the tissues of the gullet. A case described by Ziesner[1] appears to have had a similar origin. The patient had suffered from puerperal fever and from abscesses in the ovary and kidney; a collection of pus was formed between the vertebral column and the gullet, finally bursting into the latter.

Symptoms.—These depend on the size, seat, and stage of development of the abscess. Its size varies, as a rule, from a hazel-nut to a hen's egg, but in some cases the sac attains enormous dimensions. The space corresponding to the interval between the fourth and seventh cervical vertebræ is a common seat of the affection; but a purulent collection may form in connection with any part of the œsophagus. Follin and Duplay[2] state that an abscess at the upper part of the food-tract is more often situated laterally than in a central position. Whatever may be its original site, however, the abscess, especially if chronic, as it increases frequently gives rise to a swelling on the side of the neck.[3] Hocken[4] has reported a case in which a fluctuating tumour of this nature reached as high as the mastoid process. Even if the abscess itself is at a considerable depth from the surface it may cause extensive œdema of the cervical region. In two cases related by Petrunti,[5] the thyroid cartilage was pushed forwards; lateral displacement may also occur, though this is probably very rare. In the early stage of the complaint the local symptoms are vague, there being usually nothing more than a feeling of dryness and swelling within the throat, accompanied, perhaps, by some slight tenderness in the neck if it be the upper part of the food-channel that is affected. Pain in swallowing is generally present from the outset; it is at first localized in some particular part of the canal, but soon begins to radiate—usually in an upward direction—and may be referred to the entire length of the gullet. Any movement of the neck is also extremely painful, but even when the parts are at rest there is a constant throbbing pain, if the disease is acute. As the abscess develops dysphagia begins to be felt, deglutition gradually becoming all but impossible, not only from actual obstruction to the passage of food, but also from the inability of the patient to make the required muscular effort. As a rule, however, a bougie can be passed, and in two instances mentioned by Caulet,[1] this circumstance led to the erroneous inference that there was no compression of the œsophageal canal. If the abscess presses on the windpipe there is, of course, some dyspnœa—which is generally more marked during the act of swallowing, the food in its passage down the gullet narrowing still further the tracheal lumen. The voice is generally altered, and occasionally, according to Duparcque,[2] it has a very peculiar character, resembling the "quack of a duck." Cough is not a constant symptom, and when present, is too slight to be troublesome. The head is in most cases kept rigidly upright; occasionally, however, when the abscess is situated high up, the neck is thrown backwards almost as in opisthotonos, whilst, if the disease is at a lower point, the patient's chin may be drawn down towards his sternum.

---

[1] "Rarus œsophagi morbus." See "Disputat. Hallerii." Lausannæ, 1760, vol. vii. p. 629.

[2] "Traité Elém. de Pathol. externe." Paris, 1877, t. v. p. 252.

[3] Mondière: "L'Expérience." 1842.

[4] "Journ. des Connaiss. Méd.-Chir." Juillet, 1843.

[5] "Gazette Médicale." 1839, 2e série, t. vii. p. 122.

The malady usually runs an acute course, and it is probably only when it originates in vertebral caries that it has a chronic character. It may end in spontaneous rupture of the sac, the contents being discharged into the gullet, from which they are at once expectorated. If the abscess, however, is large, its sudden evacuation in this manner is attended with considerable danger, for the matter may find its way into the larynx, and cause suffocation. On the other hand, the pus may penetrate the muscular coat, and burrow rapidly in the submucous tissue, giving rise to true phlegmonous œsophagitis or *suppurative inflammation of the gullet.* This complication, however (see "Pathology"), is most uncommon, and when it does occur, there is little change in the symptoms. In some cases the inflammation becomes gangrenous, when death quickly ensues, with the usual typhoid symptoms. Gautier[3] has collected six instances in which this sequel was observed, the abscess in all of them being connected with the upper part of the food-tract.

The symptoms differ to some extent in children and in adults. In the former the abscess is, in the majority of cases, at the upper part of the neck, and, according to Barthez and Rilliet,[1] one of the earliest signs of the disease is a peculiar form of dry coryza, which shows itself within the first few days of the invasion. In children, moreover, the constitutional disturbance is generally very great; there is a considerable degree of fever at the onset of the malady, and rigors ensue as suppuration becomes established. Brain symptoms, such as convulsions and coma, are not unfrequent; they are more likely to occur when the abscess, being situated laterally, impedes the circulation through the large vessels, or presses on the vagus or spinal accessory nerve. In a case reported by Fleming,[2] the child, which was comatose when lying on its back, recovered consciousness when placed in a sitting posture.

---

[1] "De la Peri-œsophagite." Paris, 1864, p. 32.
[2] "Annales d'Obstétrique," t. ii. p. 21.
[3] "Des Abcès rétropharyngiens." Genève et Bâle, 1869

In adults the onset of the complaint is not, as a rule, so sudden as it is in children, nor are the constitutional symptoms so severe. Nausea and vomiting may occur, and fever sets in with frequent rigors as the disease develops. The patient often exhibits an extraordinary anxiety of countenance, even at an early period of the complaint.

The above description must be understood to refer to simple abscess produced by inflammation of the peri-œsophageal areolar tissue or of the lymphatic glands contained in it. Where the disease owes its origin to caries of the vertebræ, the development of the abscess is slow and unattended with febrile disorder, and it consequently acquires considerable bulk before attention is drawn to it. In such cases, moreover, previous symptoms of spinal mischief are sure to have shown themselves. Even if there be no curvature, tenderness over the affected part and diminished mobility of the vertebral column can be detected on careful examination.

Diagnosis.—The disease may be mistaken for croup, such careful observers as Abercrombie[3] and Carmichael[4] having fallen into this error. The dysphagia and stiffness of the neck which are present in peri-œsophageal abscess are, however, essential points of distinction. In true croup, moreover, the pharynx generally presents some traces of false membrane, whilst shreds can almost always be found in the sputa. The continued severity of the symptoms in peri-œsophageal abscess also serves to distinguish the disease from croup, which either terminates fatally or ends in recovery in a few days. Where the laryngoscope can be used it furnishes a ready means of differentiation.

---

[1] Op. cit. p. 120.
[2] "Dublin Journ. of Med. Science." 1840, vol. xvii. p. 13.
[3] Loc. cit.
[4] "Trans. of King and Queen's Coll. of Phys. in Ireland," vol. iii.

The disease can scarcely be confused with œsophagitis, in which a constant flow of saliva and extreme odynphagia are always present. Pericarditis with great effusion may simulate the affection, but physical exploration of the præcordial region will at once reveal the real nature of the case. Peri-œsophageal abscess may occasionally present a likeness to hydrophobia, in that liquids cannot be swallowed, but the characteristic terror is absent, and, moreover, the difficulty is still greater as regards solid food.

Pathology.—When the abscess is formed at the upper part of the throat, it is almost always situated *behind* the food-tract. In thirty-eight autopsies Gautier[1] found it in this position in every case. The abscess occasionally pierces the muscular coat of the œsophagus, and whilst remaining beneath the mucous membrane rapidly sets up *suppurative inflammation* of the whole circumference of the pharyngo-œsophageal canal. The inflammation may be limited to a small section of the canal, or may involve its entire length, the extension being favoured by the arrangement of the lymphatics in a single layer. (See "Anatomy," p. 6.) According to Zenker,[2] who has greatly elucidated this rare affection, the *submucosa* under these circumstances soon becomes converted into a cavity filled with pus, amongst which bundles of areolar tissue may still be found. In favourable cases the pus bursts through the mucous membrane at several points, and produces cribriform ulcers, which may ultimately heal, leaving small saccular depressions lined with epithelium as permanent evidences of the disease. Occasionally these minute cavities, wherein papillæ may sometimes be found, are bridged across by little bands, which further reduce their orifices. In less favourable cases the *muscularis* becomes involved, the pus disorganizes the fibrillæ, and fatty degeneration of the structure occurs. When the abscess is circumscribed, and has emptied itself into the œsophageal canal, the sac may gradually contract, and in course of healing may draw a small portion of the mucous membrane outwards, giving rise to "traction-diverticula" (see "Dilatations of the Gullet"). In another class of cases the abscess approaches the integument at the root of the neck, and comes within easy reach of the surgeon's knife.

---

[1] Op. cit p. 20. [2] "Ziemssen's Cyclopædia," vol. viii. p. 147

Prognosis.—This is always grave, though many patients recover. The least favourable cases are those dependent on vertebral caries. Peri-œsophageal abscesses are less fatal than similar abscesses in immediate relation to the pharynx.

Treatment.—According to Barthez and Rilliet[1] neither antiphlogistic nor mercurial treatment can arrest the disease, even at its commencement. When once the case has been diagnosed, the neck should be constantly fomented; and if there be any distinct fulness, poultices should be applied over the part. It is generally desirable to feed with the œsophageal tube, but if the tender age of the patient renders this method impossible, recourse must be had to nutritive enemata. A fear of establishing an œsophageal fistula or even a diverticulum has sometimes prevented surgeons from making a prompt incision into the abscess; but this danger is comparatively slight, penetration of food into the tissues being only likely to occur in cases of a decidedly gangrenous character. Where practicable the abscess should be opened; but otherwise, when there is reason to believe that suppuration has taken place, emetics may be given, in the hope that during vomiting the sac may burst. Sometimes the surgeon can cut down through the neck, and reach the abscess. A remarkable illustration of this procedure has been published by Petrunti,[2] who made an incision along the anterior border of the sterno-mastoid one inch and a half in length, and dissected carefully down till the œsophagus was exposed, and the situation of the abscess could be clearly made out. On opening the sac, twelve ounces of pus escaped, to the immediate relief of the patient. Drainage was kept up by means of a strip of lint, and the cure was complete in a month. After incision or accidental bursting of the sac the case must be watched, as the opening is very likely to heal up prematurely. When the abscess has been opened, or has burst, deglutition greatly assists in emptying the sac, by causing pressure on its walls.

Tracheotomy is sometimes called for, but as might be expected, does not always relieve the symptoms. This was shown in a case reported by Ballot,[3] in which, however, the disease was mistaken for œdema of the glottis.

---

[1] Op. cit. p. 243.

[2] Loc. cit.

[3] Loc. cit. p. 258.

THRUSH OF THE GULLET.[1]

(Synonym : Aphtha.[2])

Latin Eq.—Aphthæ œsophagi.
French Eq.—Muguet de l'œsophage.
German Eq.—Soor der Speiseröhre.
Italian Eq.—Mughetto del esofago.

Definition.—*Inflammation of the œsophagus occurring in infants, generally accompanying a similar disease of the buccal mucous membrane, characterized by an exudation creamy in colour and consistence, which usually contains large quantities of the parasitic fungus known as oïdium albicans.*

---

[1] The fact that aphthæ attack the œsophagus more frequently than the pharynx has led me to treat the subject in greater detail in this section than in the first volume.

[2] The Greek writers used the word *ἄφθα* (derived from ἅπτω, "I set on fire") for ulcerated spots in the mouth. The English word *thrush* is supposed to be allied to *thrust*, signifying a "breaking out," its earliest occurrence, so far as I am aware, being in Arbuthnot's "Practical Rules of Diet," London. 1732 (chap. iii. p. 355), where he defines *thrush* as "small round superficial ulcerations which appear first in the mouth." At present, English writers apply the word *thrush* to any aphthous affection occurring in the mouths of infants; in the words of our great medical classic, "Children in arms who exhibit aphthæ are said to have the thrush." (Sir T. Watson: "Lectures on the Principles and Practice of Physic." 1857, 4th ed. vol. i. p. 119.) The French, on the other hand, make a great distinction between *aphthe* and *muguet*, the latter being a name derived from the resemblance of the vegetation to the white blossom of the may-flower. Thus the term *muguet* is strictly limited to the parasitic affection in which the *oïdium albicans* is found, whilst *aphthe* is employed to describe a non-parasitic pseudo-membranous exudation. [The above was in type before the French translation of the first volume of this work appeared. My distinguished friends, Drs. Moure and Bertier, have added a long note in order to "establish a line of demarcation between *aphtha* and *muguet*, confounded together by the author" (myself). Whilst there is much to be said in favour of the French view, the presence or absence of the minute fungus has not hitherto been accepted by English writers as a sufficient ground of distinction. The difficulty of the subject is not diminished by the admission of Drs. Moure and Bertier that *muguet* rather frequently complicates *aphthe* (see also "Dict. Encyclop. des Sciences Médicales," t. v. p. 668).] The German writers (see Niemeyer: "Lehrbuch d. Speciellen Pathologie und Therapie." 7th Auflage. Berlin, 1868, Bd. i. p. 472 and p. 483) use the words *Soor* and *Schwammchen*, as the French employ *muguet* for the parasitic affection, whilst they apply the term *aphthen* to simple exudative inflammation of the mucous membrane of the mouth.

History.—In dealing with the history of this disorder, it may be remarked that the buccal affection has been recognized from the earliest periods, whilst the œsophageal form has only been described in modern times. Hippocrates[1] mentions the fact of newly-born children being liable to aphthæ. Celsus[2] also treats of the subject in some detail, but from his expressions I am inclined to believe that he is speaking of some more serious disease than thrush. Indeed, all the earlier writers seem to have included under the general name of *aphthæ* every form of ulceration affecting the mouth. An approach to a more correct knowledge of thrush was made by Boerhaave,[3] who described it as a papular or vesicular eruption on the mucous membrane of the mouth. Particular attention was attracted to the affection by a very severe epidemic which occurred at the Children's Hospital in Paris in 1766, and some years later a prize of 1,200 livres, offered by the Académie de Médecine for the discovery of the cause of the disease, was divided among four competitors, who all agreed in regarding "muguet" as consisting essentially in a creamy exudation from the inflamed mucous membrane. In 1785 Bleuland[4] related a most remarkable case, in which the œsophagus of an old woman who died from inanition was found filled with "aphthæ albæ," a condition which, in his opinion, gave rise to the fatal aphagia. Baillie[5] gives some drawings of the disease, in one of which the vegetation is seen to occupy nearly the entire length of the gullet. After the publication of Bretonneau's researches on diphtheria in 1821, thrush was classed among false membranes, and treated of from that point of view by Lélut,[6] Véron,[7] and Blache.[8] The latter writer also pointed out the occurrence of the vegetation in adults suffering from wasting diseases, such as cancer and phthisis, and insisted on it as a sure sign of impending death under these circumstances. Billard[9] gives some remarkable examples of the œsophageal form of the disease, which is also noticed by Andral.[10] Valleix[11] studied the malady with much attention, and was familiar with the fact of its occurrence in the gullet. Cruveilhier[12] in his great work gives three plates portraying thrush in the œsophagus. Finally, in 1842 Berg,[13] of Stockholm, was able, by microscopic examination, to establish that the disease is generally of parasitic nature, and owes its existence to a cryptogamic fungus, to which he gave the name *oïdium albicans.* The life-history of this parasite was very completely worked out by Robin[14] in 1853. Two years later Seux[15] published the results of an extensive clinical experience, and whilst accepting the view as to the parasitic origin of thrush, he endeavours to show that it is essentially a constitutional disorder, the exudation on the mucous membrane being of the nature of an exanthem. Quite recently, M. Parrot[1] has described the minute characters of the disease with the greatest accuracy, concluding that it is a local expression of general malnutrition.

---

[1] "Epidem." lib. iii.

[2] "De medicinâ," lib. vi. cap. xi.

[3] Van Swieten: "Comment. in H. Boerhaave aphorismos," t. iii. p. 197.

[4] "De sanâ et morb. œsoph. structurâ." Leidæ, p. 71.

[5] "Engravings of Morbid Anatomy." London, 1813, tab. ii. fasc. iii.

[6] "De la fausse Membrane dans le Muguet."—"Arch. Gén. de Méd." lxiii.

[7] "Observ. sur les Maladies des Enfants." Paris, 1825.

[8] Art. "Muguet," Dict. en xxx. vol.

[9] "Maladies des Enfants nouveau-nés." Paris, 1828, p. 283, et seq. See also the "Atlas d'Anat. Pathol." which accompanies that work, pl. i. and ii.

[10] "Précis d'Anat. Pathol." Paris, 1829, p. 161.

[11] "Clinique des Maladies des Enfants nouveau-nés." Paris, 1838, p. 237, et seq.

[12] "Anatomie Pathologique." Paris, 1835-42, livr. xv. pl. v.

[13] Quoted by J. Müller, "Arch. f. Anat. u. Physiol." 1842, p. 291.

[14] "Hist. Naturelle des Végétaux Parasites, &c." Paris, 1853.

[15] "Recherches sur les Maladies des Enfants nouveau-nés." Paris, 1855

[1] "Clinique des nouveau-nés." Paris, 1877, p. 213, et seq.

Etiology.—The origin of the disease is not clear, the exact bearing of the fungus which is commonly present being as yet undetermined. It is also often impossible to tell what relation the local affection bears to the extensive visceral disease which frequently accompanies it. Thrush is usually supposed to be more commonly met with in the cold northern countries than in the south, but this view is not absolutely correct. It appears to be much more frequently seen in Paris than in London,[1] and according to Seux[2] it is more common in Marseilles than in Paris. This physician, however, observed that in the capital the disease is more severe than in the southern city, a circumstance which he attributed to causes connected with the nutrition of the little patients. Thus he found that in Paris, on the appearance of the slightest symptom of the affection, the nurses, fearing that the disease might be communicated to their nipples, at once weaned the children, whereas at Marseilles the infants were suckled during the whole course of the malady.

Thrush often invades the œsophagus after it has attacked the mouth and pharynx, but it not unfrequently passes by the pharynx altogether and involves the gullet. Indeed, thrush of the bucco-œsophageal mucous membranes is more common than the coexistence of the affection in the pharynx and mouth. It is, however, extremely rare for the disease to be limited to the œsophagus. Steffen[3] did not meet with a single example of this circumscribed form of the malady in forty-four autopsies on infants who had died from œsophageal disease. Indeed, as far as I am aware, there are but three cases on record[1] in which thrush was found to be confined to the gullet. Unlike the pharyngeal form of this affection, which frequently attacks adults in the last stages of chronic disease, œsophageal thrush is scarcely ever met with except in infants.

---

[1] In comparing the diseases of infancy in London and Paris, it must not be forgotten that whilst in Paris infantile affections are carefully studied *from birth* at the Hospice des Enfants-Trouvés by thoroughly trained *internes*, in London children are not admitted into the Children's Hospitals under the age of two years.

[2] Op. cit. p. 197.

[3] "Jahrb. für Kinderheilk.," 1869, Bd. ii. p. 142. It is worthy of note, however, that among these forty-four cases, Steffen has recorded not less than fifteen instances of œsophageal diphtheria (!), a disease which, according to the experience of all other physicians, is extremely rare. It is highly probable that some of Steffen's cases (notably Nos. 12, 13, 15, 19, 26, and 31) of supposed diphtheria were, in fact, examples of thrush.

Symptoms.—If a child is suffering from aphtha of the mouth, and suddenly shows signs of difficulty in swallowing, it may be suspected that the disease has passed down to the gullet; but if spots can actually be seen in the pharynx, the œsophageal affection will generally soon come on, for when the disease reaches the pharyngeal mucous membrane it almost always extends downwards. Whilst the affection is confined to the pharynx it seldom gives rise to any dysphagia, but this symptom immediately occurs when the œsophagus is involved. The local phenomena are generally complicated by serious disease of the internal organs. In the three uncomplicated cases above referred to, the most prominent symptoms were inability to swallow and obstinate vomiting; death took place from marasmus. Wherever situated, thrush is often associated with erythema of the buttocks and enteritis; indeed, Valleix[2] asserts that in newborn children intestinal inflammation hardly ever occurs without thrush.

Pathology.—The disease is found in the œsophagus in three forms—First, as minute adherent, slightly elevated, greyish-white specks, varying from a pin's head to a lentil in size, resembling little drops of tallow, or morsels of curd; secondly, in patches mostly elliptical in shape, the long axis of which corresponds with that of the œsophagus; thirdly, in zones of varying width, covering from one-third to two-thirds of the circumference of the gullet. These zones, according to Parrot,[3] are not generally uniform in elevation, but are alternately raised and depressed; they vary in hue from pale white to greyish-yellow, the white zones being usually wider than the others.

According to Seux[4] the œsophagus ranks next to the mouth as regards frequency of invasion by thrush, the lower portion of the tube being the part most prone to the disease, which, however, very seldom extends farther down than to within a centimetre of the cardia. In some rare instances, however, the thrush extends beyond the œsophagus, Steffen[1] having reported two cases in which not only the whole of the œsophagus, but the stomach and small intestines were implicated in the morbid process. Taking twenty-six of Seux's cases, and twenty-two of Valleix's—together forty-eight examples—the pharynx was involved in twenty-three, and the œsophagus in thirty-two. In two of the latter the gullet alone was affected, but in no case was the pharynx the sole seat of disease. As a rule, however, thrush does not involve the gullet except when the mouth is very severely affected.

---

[1] Valleix, op. cit. p. 89 (for a full account of this case, see p. 239, et seq., of the same work): Andral, op. cit. p. 161; Bleuland, op. cit. p. 71.

[2] Op. cit. p. 181.

[3] Op. cit. p. 214

Op. cit. p. 113.

Although the colour of the vegetation, when first formed, is probably always yellowish-white, it is often found after death to be grey, green, or even black, the hue probably depending on the nature of the food and medicine taken, or the matters vomited, and in some cases on degenerative changes of the *materies morbi* itself. The mucous membrane underneath may show only slight injection, or there may be extensive ulceration, or even, as in one of Seux's cases, the walls of the œsophagus may be totally destroyed by gangrene.

The consistency of the exudation varies from that of cream to stout blotting-paper which has been wetted, and it generally adheres to the underlying epithelium with sufficient tenacity to resist slight attempts to tear or scrape it off.

Even the softer kind, which can be washed off, leaves behind a sort of thin foundation layer which requires some degree of force to separate it from the surface of the mucous membrane. The granular specks are usually much more intimately attached than the patches. On digesting the morbid material in liquor potassæ, and submitting it to microscopical examination, it is generally seen to consist of the spores and filaments of the *oïdium albicans*, with fat-globules, epithelial cells, and granular *débris*. Zenker has also found pus-cells in the epithelium. The fungus itself consists of cylindrical highly-refracting filaments, composed of long cells connected together, which contain granules and terminate in spores and spore-cells; the latter are round or oval, generally adherent to each other, and, like the filaments, often contain granules.

---

[1] Loc. cit.

The œsophageal fungus, according to Wagner[1] is at first situated on the level surface of the epithelium; this, however, soon becomes depressed by the penetration of the filaments, which sometimes strike so deeply as to drive in the walls of the blood-vessels of the *submucosa*. Parrot[2] states that in some instances the fungus nearly reaches the muscular coat. The rough pathological distinction between the false membrane of diphtheria and thrush consists in the fact that the former frequently attains a dense cohesion, thick wash-leather-like tissue being produced, whilst the thrush-exudation, though sometimes thick enough to narrow materially the lumen of the œsophagus, is merely a pulpy mass of aggregated particles. The microscopic characters of diphtheria have already been described (Vol. i. p. 150, et seq.).

Diagnosis.—It is impossible to diagnose the disease with certainty during life, but where there is evident difficulty in swallowing, and the vomited matters contain *oïdium albicans*, there can be little doubt that thrush is present in the œsophagus.

Prognosis.—If it can be ascertained that the gullet is extensively involved, the prospects of the patient must be regarded as extremely unfavourable. In doubtful cases, if the thrush in the mouth becomes of a dark colour, if the food be regurgitated, if there be much vomiting or diarrhœa, and if there be marked general wasting, an unfavourable opinion must be given. The presence or absence of enteritis is, however, probably the most important factor in prognosis. Few cases of thrush recover if there be inflammation of the bowels, whilst, on the other hand, in the absence of this complication, thrush is seldom a serious disorder.

Treatment.—The rules already laid down under pharyngeal thrush (Vol. i. p. 119) should be carried out with even more assiduity.

DIPHTHERIA OF THE GULLET.

Diphtheria of the gullet is extremely rare, and when present has no special clinical significance. After death, however, the false membrane is sometimes found to have involved the œsophagus. Amongst the few writers who have published cases are—Bretonneau,[1] Ferrand,[2] Espagne,[3] West,[4] Seitz, Steffen,[6] Ziemssen,[7] Trendelenburg,[8] and Laboulbène.[9] Greenhow[10] appears to have heard of cases occurring in the practice of others, but to have met with no examples himself. Squire[11] mentions the occurrence of the œsophageal affection in two instances out of a tabulated list[12] of seventy-four cases of general diphtheria, but this probably represents an unusually large proportion. In their more important works neither Trousseau nor Oertel gives any example of œsophageal diphtheria, whilst Empis points out that its non-occurrence in the œsophagus is one of the essential points of distinction between diphtheria and thrush, which so often attacks the gullet. In two of Bretonneau's cases the disease extended to the gullet. In the first, which occurred in a weakly boy, aged fifteen, it reached, in the form of long bands, to the cardiac extremity of the tube, leaving the intervening portions of the mucous membrane healthy; whilst in the second, in which the patient was an infant eight months old, the exudation formed a continuous loosely-adherent coating. Ferrand has reported two cases in which the disease was secondary to scarlatina. The false membrane extended deeply into the air-passages, and the upper part of the œsophagus was invaded. Laboulbène states that he has met with three cases. In one of them the membrane, which appeared to have extended from the pharynx, was of slight consistence, and did not lie on an ulcerated surface. Seitz has reported one instance in which a thin membranous exudation, covered with pus, extended four centimetres down the œsophagus. Steffen[13] has reported no less than fifteen examples, nearly all of which were complicated with one or more of the following conditions, viz., pneumonia, tubercle, chronic peritonitis, intestinal catarrh, follicular enteritis, caseation of the bronchial glands. In one instance there was a splenic abscess. Of the four cases in which the diphtheritic membrane was confined to the œsophagus, in one there were also extensive noma and chronic miliary tubercle of the lungs; in another there were chronic peritonitis, circumscribed pneumonia, and splenic abscess; in a third there were œdema of the lungs and intestinal catarrh; and in the fourth there were pneumonia, catarrhal inflammation of the epiglottis, and an ulcer at the lower part of the gullet.

---

[1] "Manual of General Pathology." Transl. by Van Duyn and Seguin. London, 1876, p. 99.

[2] Op. cit.

---

[1] "Memoirs on Diphtheria." Syd. Soc. Transl. 1859, pp. 17, 18, 77. &c.

[2] "De l'Angine Membraneuse." Paris, 1827, pp. 17, 20.

[3] "De la Diphthérite." Montpellier, 1860, p. 107.

[4] "Diseases of Infancy and Childhood." London, 1874, 6th ed. p. 426.

[5] "Diphtherie und Croup." von Dr. F. Seitz. Berlin, 1877, p. 349.

[6] "Jahrb. für Kinderheilk." 1869, Bd. ii. p. 143.

[7] "Cyclopædia," vol. viii. p. 145.

[8] First published in Petit's "Traité de la Gastrostomie." Paris, 1879, p. 261, et seq.

[9] "Nouveaux Elém. d'Anat. Pathol." Paris, 1879, p. 85.

[10] "Diphtheria." London, 1860. p. 184.

[11] "Reynolds' System of Medicine." 1866. vol. i. p. 399.

[12] This list is given in the "Brit. Med. Journ." 1859, p. 305, et seq.

[13] Loc. cit. See page 66, note 3, respecting these cases.

I have myself seen two cases of diphtheria of the gullet, one in a child aged three, in which the upper third of the œsophagus was covered with a thick adherent membrane, a similar deposit being present in the pharynx. My other case was that of a boy, aged six, whose pharynx, posterior nares, larynx, and trachea were covered with false membrane, whilst the whole of the œsophagus to within an inch of the cardia was similarly coated.

The nature and treatment of diphtheria have already (Vol. i. pp. 119 to 186) been so fully discussed that they need not be again referred to here.

MALIGNANT TUMOURS OF THE GULLET.

Under this head are included (1) *Carcinomata and* (2) *Sarcomata.*

CANCER OF THE GULLET.

Latin Eq.—Carcinoma œsophagi.
French Eq.—Cancer de l'œsophage.
German Eq.—Krebs der Speiseröhre.
Italian Eq.—Cancro del esofago.

Definition.—*Cancerous growth in the walls of the gullet, generally undergoing ulceration, but giving rise at the same time to great narrowing of the canal, often to perforation of the trachea or bronchi, and in rare instances to penetration of one of the large blood-vessels. In nearly all cases extreme dysphagia and marasmus are present.*

History.—From the fact that the earlier writers did not attempt to separate malignant from non-malignant growths there is considerable difficulty in giving an accurate historical sketch of cancer of the œsophagus. Inasmuch, however, as benign growths are exceedingly rare in this situation, in doubtful cases it has been assumed that the writers have referred to malignant tumours.

In the second century Galen[1] speaks of fleshy growths completely or partially obstructing the œsophagus. In the tenth century Avicenna,[2] in describing the various conditions giving rise to dysphagia, mentions tumours as a frequent cause. Fernel,[3] who flourished in the sixteenth century, relates the case of a woman who died in consequence of her gullet being blocked up, close to its cardiac extremity, by a large hard mass, which prevented any food passing into her stomach for two months before her death. Coiter,[4] who lived somewhat later, mentions an interesting case of a woman who died after having suffered from dysphagia for eight years. After death a "scirrhous tumour of the size of a man's fist was found obstructing the lower end of the gullet." In Bonnet's[5] large collection of post-mortem records there are several cases of growths connected with the œsophagus, which had destroyed the patient by rendering swallowing impossible. An excellent account of various forms of œsophageal obstruction was given by Beutel.[6] Boerhaave and his pupil and commentator, Van Swieten,[7] were familiar with cancer of the gullet, and to the latter is due a remarkably vivid description of the sufferings endured by the victims of this disease. The subject did not escape the attention of Morgagni,[8] who, besides commenting on the cases of Bonnet and others, mentions one or two occurring in his own experience. Lieutaud[9] gives several examples, chiefly collected from the writings of other observers. Sir Everard Home[10] relates many cases of œsophageal stricture, some of them undoubtedly malignant. Baillie[11] referred to the subject in his work on pathology, giving also some excellent engravings[12] of œsophageal tumours, and soon afterwards Monro *tertius*[13] published some additional cases. Subsequently Bell,[14] Howship,[15] and Mondière[16] recorded examples of the disease, and described its features in some detail. Since then, numerous cases have been published in the medical journals, and in the transactions of the various medical societies, whilst the subject has been more or less fully treated by Walshe,[17] Lebert,[18] Follin,[19] Béhier,[20] Zenker and Ziemssen,[21] Luton,[22] König,[23] and Butlin.[24]

---

[1] "De symptomatum causis," lib. iii. c. ii.

[2] "Canon," lib. iii. fen 13, tract. i. cap. iv. et v.

[3] "De morbis univers. et particular. Libri quatuor posteriores pathologiæ." Lib. vi. cap. i. p. 125. "Trajecti ad Rhenum," 1656.

[4] "Observ. Anatom. Chir." p. 121.

[5] "Sepulchretum." Genevæ, 1700, lib. iii. sect. iv. obs. ii.

[6] "De strumâ œsophagi." Tübingen, 1742.

[7] "Comment. in H. Boerhaave aphorismos." Lugdun. Batavorum, 1745, t. ii. § 797, p. 644, et seq.

[8] "Epist. anat. med. de sedibus et causis morborum." Lugdun. Batavorum, 1767, ep. xxviii. sect. 14, 15, 16, t. iii. p. 12, et seq.

[9] "Hist. Anat. Med." Parisiis, 1767, t. ii. p. 305, et seq.

[10] "Pract. Observ. on the Treatment of Strictures in the Urethra and the Œsophagus." 1805, 3rd ed. vol. i. p. 537, et seq.

[11] "Pathological Anatomy." London, 1802.

[12] "Engravings to illustrate Morbid Anatomy." London, 1872, tab. ii. fasc. iii.

[13] "Morbid Anatomy of the Human Gullet, &c." Edinburgh, 1811.

[14] "Surgical Observations." London, 1817, vol. i. p. 76, et seq.

[15] "Practical Remarks upon Indigestion, &c." London, 1825, p. 161, et seq.

[16] "Arch. Gén. de Méd." 1833, 2 série, t. iii.

[17] "On the Nature of Cancer." London, 1846.

[18] "Traité des Maladies Cancéreuses." Paris, 1851, p. 442, et seq.

[19] "Sur les Rétrécissements de l'Œsophage." Paris, 1853, p. 49, et seq.

[20] "Conférences de Clinique Médicale." Paris, 1864, p. 57, et seq.

[21] "Cyclopædia of Pract. Medicine." London, 1877, vol. viii. p. 172, et seq.

[22] "Nouveau Dict. de Méd. et de Chir. Paris, 1877, t. xxiv. p. 384, et seq.

[23] "Deutsche Chirurgie," von Billroth und Lücke. "Krankheiten des Pharynx und Œsophagus." Stuttgart, 1880, p. 68, et seq.

[24] "Sarcoma and Carcinoma." London, 1882, p. 159, et seq.

Etiology.—Though cancer of the gullet may be regarded as the typical disease of that organ—the affection with which most practitioners are best acquainted—it is not relatively common. According to Zenker and Ziemssen,[1] in 5,079 autopsies, primary cancer of the gullet was present only thirteen times. Concerning the relative liability to cancer of the œsophagus as compared with other organs, there is less positive evidence. Dr. Walshe[2] states that 13 out of 8,289 deaths from malignant disease in Paris were ascribed to cancer of the œsophagus. In a table of 471 cases, the accuracy of which is vouched for by Lebert,[3] the gullet was the seat of the disease in 8 instances. The difference in the last two series is so great that at present the question must remain undecided. The same causes which predispose to or excite cancer in other parts of the body lead to its development in the œsophagus. Amongst the former are heredity, age, and sex; amongst the latter, continued local irritation, accidental injury, and chronic inflammation may probably be reckoned. Heredity appears to have considerable influence, for among sixty cases which I have examined with reference to this circumstance, some member of the patient's family had died from malignant disease in eleven instances, whilst among ten cases observed by Richardson,[4] there was in no instance wanting a history of some malignant affection amongst the relatives. Age greatly influences the outbreak of the disease, which is extremely rare under forty. The greatest number of cases are met with between fifty and sixty, although the *decennia* immediately before and after that period furnish almost as many cases. In my 100 fatal cases the incidence of the disease in relation to age was as follows[5]:—

---

[1] "Cyclopædia," vol. viii. p. 173.

[2] Op. cit. p. 270.

[3] Op. cit. p. 441.

[4] "Trans. St. Andrew's Med. Grad. Assoc." 1872-73, vol. vi. p. 184.

[5] Of these 100 cases, 60 of the patients were under my own care, 23 having been treated by me in private practice, 28 at the Throat Hospital, and 9 at the London Hospital; 25 were treated by my colleagues at the Throat Hospital, and 15 by my colleagues at the London Hospital. These cases all occurred before the year 1875, when I published some lectures on the subject in the "Medical Times and Gazette." My *clinical* experience is based on a far larger number of cases, but patients suffering from cancer of the gullet seek a great variety of medical advice, and cases which have been treated up to within a few weeks of their death are often finally lost sight of. My published statistics being based on 100 cases, I have not thought it worth while to introduce fresh figures by adding those I have met with since 1875.

TABLE 1.—AUTHOR'S CASES.

Age.	No. of cases.
From 30 to 40	8
,, 40 to 50	28
,, 50 to 60	34
,, 60 to 70	24
,, 70 to 80	6
Total	100

The following table is an analysis of thirty cases occurring in the "Transactions of the Pathological Society."[1] It will be seen that the results closely correspond with my own cases :—

TABLE 2.—CASES FROM "TRANS. PATH. SOC."

Age.	No. of cases.	Percentage.
From 30 to 40	2	6·66
,, 40 to 50	6	20·
,, 50 to 60	11	36·66
,, 60 to 70	8	26·66
,, 70 to 80	2	6·66
Over 80	1	3·33
Total	30	

The following is an analysis of forty-three cases observed by Béhier,[2] but it is right to remark that in three of the cases occurring between twenty and forty the diagnosis was doubtful :—

TABLE 3.—BÉHIER'S CASES.

Age.	No. of cases.
From 20 to 30	3
,, 30 to 40	4
,, 40 to 50	10
,, 50 to 60	11
,, 60 to 70	10
,, 70 to 80	3
At 82	1
,, 86	1
Total	43

---

[1] There are in all forty nominal cases reported in the "Transactions" up to the end of the session, 1874-75, but some of them do not appear to have been true cases of cancer, others are incomplete, and a few, having been reported by myself or my colleagues, are included in my own series.

[2] "Conférences de Clinique Médicale." Paris, 1864, p. 119, et seq.

The following table gives the result of fifty-eight cases collected by Mr. Butlin[1]:—

TABLE 4.—BUTLIN'S CASES.

Age.	No. of cases.
From 30 to 40	8
,, 40 to 50	13
,, 50 to 60	24
,, 60 to 70	11
,, 70 to 80	1
Over 80	1
Total	58

It may be remarked, however, that if the various tables were corrected in accordance with the number of people living at each decennial period, they would show a constantly increasing mortality from the disease as age advances.

Men are much more liable to the disease than women, a fact which is very distinctly borne out by my own series of 100 cases, of which 71 were of the male, and only 29 of the female sex. Habershon[2] gives a table of "85 cases collected from 'Guy's Hospital Post-mortem Records,' the 'Pathological Society's Transactions,' and other sources," of which 59 were men and 26 women. In Petri's[3] cases examined at the Pathological Institute at Berlin, the liability of the male sex to the disease is even more remarkable, for out of 44 cases, in only 3 were women the subjects of the disease. Ziemssen[4] reports 18 cases, among which there was but 1 female, but the diagnosis was not verified in every instance. Zenker[5] met with 15 cases of the disease, of which 11 were men and 4 women. Whilst, however, men are more frequently attacked than women, the latter suffer at an earlier age. Thus, in Table 1, all the patients under 40 years of age were women, three of them having been 34, and the rest older. The average age of the men in my series was 52·43, and that of the women 44·5, whilst in Habershon's cases the average age of the men was 55½, and that of the women 44½, the latter average tallying exactly with mine. The greater predisposition of the male sex to cancer of the œsophagus is remarkable when it is recollected that more than twice as many women as men die of malignant disease, and that cancer of the contiguous viscus—the stomach—which in its liability to irritation is exposed to the same conditions as the gullet, is equally common in both sexes.[1]

---

[1] Mr. Butlin gives a list comprising fifty-nine cases, but in one of these the age of the patient is not stated.

[2] "On Diseases of the Abdomen." 1878, 3rd ed. p. 84.

[3] "Ueber 44 im Pathologischen Institut in Berlin in der Zeit von 1859 bis zum März 1868 vorgekommene Falle von Krebs der Speiseröhre." Berlin, 1868.

[4] Ziemssen's "Cyclopædia," vol. viii. p. 193.

[5] Ibid. vol. viii. p. 186.

The tubercular diathesis, which is ordinarily regarded as antagonistic to cancer in general, has been thought, on the contrary, by Lebert,[2] Hamburger,[3] and Fritsche[4] to predispose to that disease in the gullet. Lebert observed the coexistence of pulmonary tubercle with cancer of the œsophagus in seven out of nine cases, whilst Béhier[5] insists on the frequent coincidence of the two affections. The general experience of the profession points to an opposite conclusion, and considering the frequency of tubercle, the two diseases cannot be said to coexist frequently. Petri[6] found only 4 examples in his 44 cases, whilst out of 100 examples I only met with 3, in all of which the pulmonary disease showed signs of retrograde change.

Amongst local causes, the abuse of spirits has, since the time of Gyser,[7] been looked upon as an important factor in the production of œsophageal cancer, and the greater prevalence of the disease among men as compared with women has been attributed to this cause. Out of my own 60 cases only 5 acknowledged to have been free drinkers, and 6 others were publicans by occupation. It is quite possible that the abuse of spirits may predispose in several ways to the development of cancer in the gullet. Thus, by lowering the tone of the nervous system and causing degeneration of tissue, it may render all the organs less capable of resisting the constitutional taint. There does not, however, exist any decisive evidence on this point. Again, alcohol may directly irritate the mucous membrane or indirectly produce a similar result by causing eructations and vomiting. Further, when people are half intoxicated, they are apt to be careless as to what and how they eat, and under these circumstances pieces of meat or foreign bodies accidentally introduced into the food are more likely to be swallowed, and thus to set up irritation. My own impression, on the whole, is that the effect of excessive indulgence in alcohol has been overrated in considering the etiology of œsophageal cancer.

---

[1] Excluding cancer of the sexual organs, which is disproportionately frequent in woman, malignant disease affects both sexes in an almost equal ratio. This makes the greatly more common occurrence of cancer of the gullet in men all the more remarkable.

[2] Op. cit. p. 445.

[3] "Klinik d. Œsophaguskrankheiten." Erlangen, 1871.

[4] "Ueber d. Krebs d. Speiserohre." Berlin, 1872.

[5] Op. cit. [6] Loc. cit.

[7] "De fame lethali ex callosâ œsophagi angustiâ." Argentorati, 1770, sect. vi.

The accidents which arise from taking too large or too hot morsels of food deserve a passing notice. Nearly a century and a half ago Van Swieten[1] was disposed to attribute the origin of the disease to swallowing very hot fluids, especially coffee, which at that time was coming into general use. This view, however, was no doubt erroneous, and was strongly opposed by Morgagni.[2] It is only when an excessively hot morsel has been swallowed that it can give rise to active symptoms. It is possible, also, that hot liquids may in some cases have caused an ulcer which has subsequently contracted in healing, and that the disease afterwards met with, though mistaken for cancer, was not really of a malignant character.[3]

Sometimes the supposed cause, such as a foreign body sticking in the throat, is only the first symptom of the malady, but there appear to be other cases, such as those of Henoch[4] and Fritsche,[5] in which the swallowing of a very hot morsel of food seems to have determined the *site* of the growth.

In addition to other causes of œsophageal cancer the irritation set up by indigestion, with its attendant troubles, eructations and vomiting, must be mentioned. These have been already referred to as resulting from the abuse of alcohol; but of course they may arise from other causes.

In three cases that have come under my notice the patients suffered from vomiting for many years before any dysphagia was observed, and it is quite possible that in these instances the retching excited the development of cancer in the gullet. It is worthy of note that none of these patients were addicted to the use of alcohol.

Cancer may supervene on *simple stenosis*, as in a case reported by Dr. Hilton Fagge;[1] and I have met with several instances in which slight chronic inflammation having existed for many years, cancer ultimately showed itself. The following is a good illustration, but others equally remarkable have come under my observation. A poor woman, aged forty-five, consulted me in 1863, on account of dysphagia. A bougie could be passed with ease, and as the patient was of very nervous temperament I treated her with valerianate of zinc and similar remedies. She frequently consulted me, and for some years I regarded her case as "functional;" judged of, however, by the light of others which I have since met with, I feel sure that the symptoms were due to chronic inflammation of the œsophagus. In the early part of 1874 a cancerous growth was seen with the mirror protruding from the orifice of the œsophagus, and by the end of the year the patient died from extensive epithelioma of the gullet. It appears more probable that the cancer originated as a spot chronically inflamed than that malignant disease existed all the time, but was completely masked, and progressed so slowly that it did not terminate fatally for ten years.

---

[1] Op. cit t. ii. pp. 647, 648.

[2] Op. cit. § 797, ep. xxviii. art. 15, t. iii. p. 15.

[3] As in a case reported by Leroux, "Cours sur les généralités de la Médecine Pratique." Paris, 1825, t. i. p. 315.

[4] Casper's "Wochenschr. f. d. gesammte Heilk." 1847, No. 39.

[5] Op. cit. p. 71. These cases are quoted by Zenker and Ziemssen, who also refer to another case by Deininger, which, however, does not appear to me to be so conclusive.

The frequency with which cancerous growths originate in cicatrices in other parts of the body makes it probable that they sometimes have a similar starting-point in the œsophagus. Neumann[2] has recorded what appears to be an example of this mode of origin, and Ziemssen[3] has met with another which might bear a like interpretation. From the analogy of the tongue, where it is a matter of common observation that syphilitic ulceration is prone to take on a carcinomatous character, it may justly be inferred that scars left by old venereal mischief in the gullet may become the site of malignant disease.

Symptoms.—The most constant, striking, and important phenomenon is difficulty in swallowing. It is this which usually first attracts and then rivets the sufferer's attention. The train of symptoms is generally somewhat as follows:—The patient first experiences an occasional obstruction to the descent of food, if he takes a large mouthful, or if the food is of a dry nature. In a short time this difficulty becomes habitual, and the patient complains that food lodges somewhere—usually at the same point—when he tries to swallow.

---

[1] "Guy's Hospital Reports," series 3, vol. xvii.

[2] "Virchow's Archiv," Bd. xx. p. 142.

[3] "Cyclopædia of Medicine," vol. viii. p. 188.

He now often begins to be troubled with cough, especially when deglutition is attempted, and as the disease progresses he is obliged to wash down every mouthful with a draught of liquid, and he soon finds that he cannot take solids at all, except after prolonged mastication and with the aid of fluids. Then he is no longer able to swallow solid food in any form, his diet is restricted to liquids, and he loses flesh rapidly. As time goes on in some cases the stricture becomes so narrow that even liquids cannot be got down, or a fistulous opening being formed between the œsophagus and trachea, the swallowed liquids pass into the windpipe and are immediately ejected by a violent and painful attack of coughing. As soon as the gullet becomes much contracted the patient begins to spit up a frothy fluid, which is at first clear, and closely resembles saliva, but which soon becomes viscid or muco-purulent, and is not unfrequently streaked with blood. Sometimes small particles are voided, which, on microscopic examination, are found to be of cancerous nature. Emaciation rapidly advances, and the patient soon becomes greatly wasted, and so weak that he is unable to take any exercise, or indeed to perform any act requiring muscular effort. The cancerous cachexia is often absent, the patient dying of starvation before the constitution becomes markedly perverted.

On analysing the symptoms it will be found that there is not one which may not be occasionally absent, and that the mode of their occurrence varies in particular cases. Dysphagia is the most constant symptom, but there is at least one case on record[1] where it was not present. The patient generally states that the food is arrested at the upper part of the gullet, even in those cases where subsequent post-mortem evidence shows that the stricture was situated quite low down, a circumstance probably to be explained by the occurrence of reflex spasm. Though the dysphagia generally comes on gradually, it sometimes arises quite suddenly. I do not refer here to those cases in which the patient having swallowed too large or too hot a mouthful, the symptoms have developed from that date, but to those rare instances of which the following, recently under my notice, may be taken as an illustration :—

E. Y., aged fifty-six, was in perfect health, as far as he was aware, until a certain day when at dinner. After eating a few mouthfuls a piece of meat stuck in his throat, and he had to leave the table and eject it. He returned to his dinner, but could not swallow any food, though he was able to drink beer. In the evening he tried some supper, but found he could not swallow solids; and from that day till his death, seven months afterwards, he was never able to take a morsel of solid food.

---

[1] "Trans. Path. Soc." vol. vii. p. 188.

As has been already shown, dysphagia begins with a difficulty in swallowing solids, and the patient is soon obliged to depend entirely on liquids. In swallowing these he makes a loud gurgling noise, which is audible to himself, and even to those standing near. At first he drinks easily, but after a little time he finds that the fluids will only pass very slowly down the gullet, and if he is not very careful, the drink will be suddenly and violently ejected through the mouth and nose. Occasionally a portion of the drink or semi-solid substance may be retained for a few minutes and then vomited, but the alkaline character of the *ejecta* shows that they come from the œsophagus and not from the stomach.

Patients *in extremis*, previously almost unable to swallow liquids, may suddenly regain their power of taking semi-solid food for a short time before death, but such improvements are illusory, and may probably be explained by the sloughing away of a portion of the growth, or by diminution of spasm from increasing muscular debility. The act of deglutition is very seldom painful, but there is sometimes a dull aching sensation, which, if present, is generally aggravated on swallowing. The pain is occasionally referred to a definite spot, which corresponds with the point where the food seems to lodge. At other times it is felt between the shoulders, behind the sternum, at the epigastrium, or more rarely in one of the ears. The pain is often slight, amounting to little more than uneasiness, and it is only in rare cases that it is described as sharp, cutting, or burning. The suffering is, as a rule, more keenly felt at night, and sometimes it is sufficiently severe to keep the patient from sleeping.

Here it may be mentioned as a curious circumstance that a darting pain between the shoulders—occurring independently of deglutition, and not increased by that act—is occasionally the first symptom of cancer of the gullet. I have met with two instances in which this symptom preceded dysphagia by more than three months.[1]

---

[1] Odynphagia preceded dysphagia in a case of malignant disease of the œsophagus reported by Cooper Forster ("Guy's Hosp. Reports," 1858, 3rd series, vol. iv. p. 1., et. seq.), and in another by Sydney Jones ("Trans. Path. Soc." 1860, vol. ix. p. 101).

The digestion becomes greatly impaired. Milk or eggs sometimes remain in the stomach for four or five hours without undergoing any appreciable change. Positive evidence of this can often be obtained on examination of the vomit of patients after the passage of bougies for the purpose of dilatation. In order to lessen the chance of inducing sickness I always direct the patient to abstain from food for some hours before the instrument is to be used, but in spite of this precaution, the contents of the stomach are occasionally brought up, and I have not unfrequently remarked that they have scarcely been acted on by the gastric juice. Independently of the use of instruments, however, real gastric vomiting occasionally takes place, and when the disease is advanced, this is a very distressing symptom. For the stricture appears to become tightened at the moment of vomiting, and entirely prevents the ejection of matters from the stomach, whilst repeated fruitless contractions of the latter viscus often give rise to a feeling of weight and sometimes to a dull heavy pain in the epigastrium. The patient is also further tormented in some instances by the impossibility of ridding himself by eructation of the gas which is formed in large quantities. As might be expected, the excretions become much diminished in quantity. The bowels frequently do not act for a week or ten days together, and the fæces are very hard ; as a rule, very little urine is passed.

Hunger is sometimes complained of when the patient begins to be unable to swallow solids, but this soon passes off, and in an advanced stage of the disease the very thought of food is generally loathsome. When the canal is nearly closed up the patient's sufferings are aggravated by dryness of the throat and intense thirst, which generally persist till within a few hours of death. Should there be much ulceration (and especially when the disease affects the upper part of the throat) the breath has often a faint or fetid odour, whilst if gangrene comes on the smell is horribly offensive.

Cough is of frequent occurrence, and is generally due to slight chronic laryngitis, which commonly accompanies stricture of the œsophagus. The affection of the windpipe may occur as an extension of the cancer, or it may be caused by the passage of food or the overflow of saliva into the larynx. If a fistulous communication has been established between the œsophagus and the trachea or bronchi, the coughing is of a very violent kind, and is called forth whenever swallowing is attempted. Dysphonia is not unfrequent. It may be caused by slight inflammation of the larynx, or by paralysis of a vocal cord from implication of one of the recurrent nerves in the disease. For obvious anatomical reasons (see Vol. i. Fig. 90) the left nerve is much more frequently affected than the right. When the latter is paralysed it usually indicates that the cancer is situated in the upper part of the throat. There may even be some dyspnœa or stridor, when, as generally happens in the early stage of nerve-pressure, it is the abductor muscle which is mainly affected. The laryngeal symptoms are of course greatly intensified when both abductors are involved (see Vol. i. p. 443, Case 3).

In an advanced stage of the malady, the growth may press directly on the windpipe posteriorly, and thus give rise to severe dyspnœa. There are seldom any external signs of the disease, but when the upper third of the gullet is affected, careful examination will sometimes detect a slight thickening in the neck, some distance below the surface, and in rare cases the deep cervical glands can be perceived to be enlarged. Still less frequently the superficial glands are enlarged and tender. On introducing the œsophagoscope, the situation and character of the disease can sometimes be made out, but its extent cannot be ascertained.

On auscultating the gullet the site of the disease can generally be determined. At the commencement of the affection, the "bolus" may be merely delayed, or irregularly forced down, but temporary arrest in its descent can generally be observed at a very early period. As the disorder gains ground the acoustic signs become more marked. Instead of the sound of a small fluid body rapidly passing beneath the stethoscope, a prolonged and confused gurgling noise is heard over the diseased spot, and a little above it. Below this point deglutition is scarcely audible.

The bougie, as a rule, furnishes very precise information if it be carefully used while the patient is fully under the influence of an anæsthetic. On the other hand, the knowledge obtained by means of this instrument whilst the patient retains consciousness is generally incomplete and often misleading Chloroform is the best agent for the purpose, ether having an irritating effect in these cases, and nitrous oxide being too transient in its action. On attempting to pass a bougie, it will be found that the progress of the instrument is completely arrested at a certain spot, or that it can only be passed with difficulty through a constricted opening. Sometimes after the bougie has penetrated one stricture it encounters a second, the two obstructions generally corresponding to the upper and lower edges of a single ulcer, but in rare cases being caused by two separate growths.[1] However gently the instrument may be used, its point will sometimes be found to be smeared with blood, and the patient may spit up a few drops, or even a drachm or two, of blood directly after the operation.

The local phenomena and physical signs of the disease having been discussed in some detail, it is necessary to make a few further remarks on the general symptoms exhibited by the patient. These are progressive emaciation, extreme muscular debility, and intense faintness.

The weight of the patient gradually but steadily diminishes. Thus, one of my patients was reduced from twelve to five and a half stone in less than three months, and in another case five stone were lost in seven weeks.

But whilst emaciation almost invariably accompanies the malady, patients occasionally die from asthenia, while the nutrition is still almost unimpaired. As an example I may mention that in one of my patients on whom Mr. Heath performed gastrostomy after nine days' total privation of food, the fat in the abdominal walls was an inch in thickness, whilst the omentum was a mass of adipose tissue. In another case on which I recently made a post-mortem examination, though the disease had run an unusually long course, there was not a trace of wasting in any part of the body. All patients, however, experience a dreadful sense of faintness. Whilst revising these pages I have received a letter from a patient in a very advanced stage of the complaint, in which the following passage occurs:—"I do not think anything has passed down during the last forty-eight hours! My weakness rapidly increases, and I suffer from a *terrible faintness*. My flesh decreases daily, and my body has gone hollow." Except in very warm weather there is often a feeling of cold, not only in the extremities, but in the body generally.

Although the sufferings are very severe until within a day or two of the fatal termination, the last hours are generally quite placid, the patient retaining his faculties till very near the end, and passing away in a state of gradually deepening coma.

---

[1] See the cases of Sédillot ("Gaz. Méd. de Strasbourg," 1853, p. 69); Poinsot (reported by Bidau, "De l'Œsophagotomie." Bordeaux, 1881, p. 79); Golding Bird ("Trans. Clin. Soc." 1882, vol. xv. p. 36); and Annandale ("Liverpool Med.-Chir. Journ." July, 1881, p. 14)

Death usually takes place from exhaustion, unless some complication should arise from the extension of the disease to neighbouring organs. The most common form of this is perforation into the air-passages. In my 100 cases death resulted from exhaustion in 78, from pneumonia in 17, from acute pleurisy in 3, and from gangrene of the lungs in 2 instances.

The modifications in the symptoms, which are caused by the spread of the cancer in different directions, require a brief notice. As just remarked, the most common extension is into the air-passages, between which and the œsophagus a communication or *perforation*[1] is often established, but in rare cases a large vessel may be laid open by the ulcerative process. As the result of the invasion of neighbouring parts by the growth, inflammation of many adjacent organs and tissues may occur, pericarditis, pleurisy, pneumonia, or even peritonitis being occasionally met with, whilst two cases are on record[2] in which paralysis of the lower extremities ensued from the disease at last reaching the spinal cord.

The signs of *perforation of the gullet* depend on the nature of the communication which is set up with the food-tract. Thus, simple *perforation into the peri-œsophageal connective tissue* leads to abscess, sloughing, and gangrene, but the symptoms are often so slight that they are not recognized during life. On the other hand, *perforation into the air-passages* produces such a characteristic train of symptoms that it is generally easily discovered. This is the most common form of perforation, and is especially to be feared in those cases in which there is frequent but not severe spitting of blood. Violent coughing and considerable dyspnœa when the patient attempts to swallow are the symptoms which show that the air-passage has been penetrated.[3]

---

[1] By some authors *perforations of the gullet*, from whatever cause arising, and whatever the nature of the communication established, are classified together and treated in a separate article, though the utility of such an arrangement is not obvious. The perforations produced by a malignant growth, an aneurism, or a foreign body, are totally different in their mode of development, in the symptoms they cause, and in their ultimate termination. Again, the widest difference exists, according as the perforation takes place into the air-passages, into a large vessel, or into the peri-œsophageal tissue. It is difficult, therefore, to discover what advantage can be derived from bringing together a set of accidents disagreeing in almost every particular.

[2] Mondière, "Arch. Gén. de Méd." t. xxx. p. 515, and Zenker, "Ziemssen's Cyclopædia," vol. viii. p. 180.

[3] According to Lebert (op. cit. p. 445), perforation of the air-

Perforation of a large vessel is a rare termination of the disease, and did not occur once in my 100 cases. Although there are numerous instances recorded in medical literature, it must not be forgotten that these cases are generally published on account of their comparative rarity, and that they exemplify the exception rather than the rule. If a large vessel be ruptured, violent hæmorrhage comes on, to which the patient may succumb in a few seconds, or the bleeding may stop for some hours—but only to break out anew with a fatal result. The subject of perforation will be again referred to in dealing with the pathology.

Pathology.—There has been a growing tendency for some years past to consider that a very large proportion of cancers of the œsophagus are of epitheliomatous nature, and Zenker and Ziemssen[1] go so far as to state that this is the *only* form which is met with in this situation. This statement, however, is too absolute, for in the elaborate collection of cases of malignant disease made by Mr. Butlin,[2] three were undoubtedly scirrhous in character, whilst one certainly belonged to the medullary, and another to the colloid variety of carcinomata. The three instances of hard growth showed a well-marked alveolar structure, and their course was much more chronic than that of the epitheliomatous cases. The nature of the medullary tumour was determined by so high an authority as Dr. Joseph Coats,[3] of Glasgow, whilst the case of colloid cancer was reported on by the committee of the Pathological Society,[4] and may therefore be accepted as undoubtedly genuine. It presented a honey-combed structure, and contained a viscid material. The opinion, however, seems to be now pretty generally entertained by pathologists that the appearances which sometimes resemble scirrhous or encephaloid cancer depend on the varying degrees of density in the structure of the stroma, or on degenerative changes which may have taken place in the morbid tissues themselves. The disease is usually supposed to commence in the

---

passages does not always give rise to these symptoms, and it sometimes happens that the lesion is not suspected until the autopsy is made. This observation can only apply to very small perforations, or to those which have taken place only a short time before death.

[1] "Cyclopædia of Medicine," vol. viii. p. 173.

[2] "Sarcoma and Carcinoma." London, 1882, pp. 177, 178. See also Tables, pp. 185—187.

[3] "Glasgow Med. Journ." 1872, 2nd series, vol. iv. p. 102.

[4] "Trans. Path. Soc." 1868, vol. xix. p. 228.

deeper layers of the *mucosa*, but in some cases it appears to be developed from the epithelial lining of the follicles.

If the œsophagus could be exposed to view at a very early date the disease would probably present itself in the form of one or more small isolated patches; but by the time death takes place, it has generally involved the whole circumference of the gullet, and extended for three or four inches in the vertical direction. Sometimes, however, even when the patient has died from dysphagia, it is found after death that the growth occupies only one side of the œsophageal canal. The surface of the tumour is more or less irregular, and is generally extensively and deeply ulcerated.

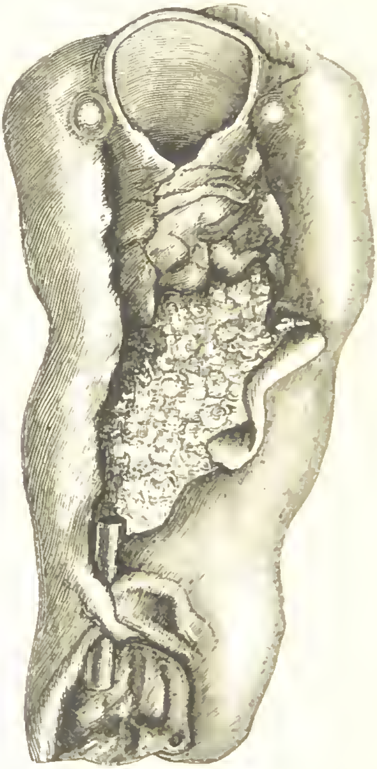

FIG. 13.—MALIGNANT DISEASE OF THE GULLET.

At the narrowest part only the fine glass rod, shown in the cut, could be passed through the stricture.

(*From a Specimen in the Museum of the Throat Hospital.*)

Among Butlin's fifty-three cases ulceration had taken place in forty-nine. The ulcer has, as a rule, a foul sanious base and a raised thickened everted edge. It can generally be perceived that the stricture which has existed during life has been caused by masses of growth projecting into the canal, or by general thickening of the walls, or by the out-turned edges of the ulcer diminishing the œsophageal lumen. This last cause is principally in operation at the upper and lower borders of an ulcerated surface, and hence observers have sometimes been led to imagine that there were two growths, each causing a stricture in the canal, when, in point of fact, there was only one tumour.[1] When the mass is cut into, the section is of a greyish-white or occasionally of a brownish-red colour, and when squeezed, yields a milky juice. On microscopic examination this fluid is found to consist of aggregated and distinct epithelial cells, and the growth is seen to be made up of a stroma of fibrillated tissue, arranged so as to form alveoli of various shapes and sizes, within which flat epithelial cells are found. Some of these bodies are grouped together so as to produce concentric globes, which on being cut through present the well-known form of nested cells. The epithelial elements may be seen making their way into the tissues around the ulcer, and beyond these again will be found an infiltration of small round corpuscles (indifferent cells).

There is considerable difference of opinion as regards the part of the gullet most frequently attacked. Sir Everard Home[2] says: "There is this one spot immediately behind the cricoid cartilage where the fauces may be said to terminate and the œsophagus to begin, in which such a contraction is so often met with, that I must consider it as more liable to become diseased than the rest of the canal." Rokitansky[3] affirms that the upper half of the gullet is most often the seat of the disease, and Habershon's experience and my own point to the same conclusion. Klebs[4] and Rindfleisch[5] find the middle portion most frequently affected, whilst Petri,[6] and Zenker and Ziemssen[7] have observed that the lower third furnishes the greatest number of cases. The following tables show these various results:—

---

[1] See a case reported by Motta, "Gazette Médicale." 1873.
[2] Op. cit. vol. ii. p. 395.
[3] "Œsterr. medicin. Jahrb." 1840, Bd. xxi. p. 225.
[4] "Handbuch d. pathol. Anatomie." 1868.
[5] "Pathol. Histology." Syd. Soc. Transl. 1872. p. 157.
[6] Loc. cit.
[7] Op. cit. p. 176.

MACKENZIE.

Upper third	44
Middle ,, ...	28
Lower ,, ...	22
Lower half	6
	100

HABERSHON.

Upper part	33
Middle ,, ...	30
Lower ,, ...	10
	73

PETRI.

Upper third	2
Middle ,, ...	13
Lower ,, ...	18
Upper and middle thirds ...	1
Middle and lower ,, ...	8
Whole canal	1
	43

ZENKER.

Upper third	2
Middle ,, ...	1
Lower ,, ...	6
Upper and middle thirds ...	2
Lower and middle ,, ...	3
Whole canal	1
	15

Mr. Butlin[1] states that in his series of fifty-nine cases, "in by far the larger number of instances, the disease occurred in the upper than in the middle or lower thirds," but "the point of junction of the middle and lower thirds was three times more often attacked than that between the two upper thirds; so that if the canal be divided into halves instead of thirds, the number of cases affecting each half is very nearly equal."

As the result of *clinical* examination, Ziemssen[2] has found the disease situated in the lower third of the gullet in thirteen cases out of eighteen. The great discrepancy between the different tables may, perhaps, be explained by the fact of some pathologists having excluded cases of cancer of the upper part of the œsophagus in which the pharynx was also implicated. As has already been pointed out (Vol. ii. p. 1), the line of demarcation between the pharynx and the gullet is arbitrary, some anatomists fixing the *lower border of the cricoid cartilage* as the point of separation, whilst others take the *cricoid generally* as the boundary line. As cancer of the food-tract behind the cricoid is relatively very common, it makes a great difference whether this situation be included in the pharynx and excluded from the œsophagus in statistical tables. Further, as Mr. Butlin[3] observes, when the disease is wide-spread, the difficulty of determining its primary point of invasion impairs the accuracy of all calculation as regards the part of the œsophagus most frequently affected.

---

[1] "Sarcoma and Carcinoma." London, 1882, p. 162.

[2] Op. cit. p. 193.

[3] Op. cit. p. 163.

As König[1] has remarked, the situation of cancer of the œsophagus is a matter of some practical importance, for if the growth is at the lower part, gastrostomy is the only palliative operation that is justifiable.

Cancer of the œsophagus is sometimes confined to that tube, but observation shows that it spreads both by continuous extension and by secondary deposit. In my 100 cases the deep cervical glands were alone attacked in fourteen cases (in conjunction with other glands in three other cases, and in conjunction with other organs in four cases); in two cases one lung was involved, in one case the liver, and in one the liver and one lung were implicated, whilst the left kidney, stomach, and tongue were each once affected. Out of forty-four cases of cancer in the upper third, in twelve the disease at the same time involved the pharynx above the level of the arytenoid cartilages, and in one case the thyroid gland, whilst of thirty cases at the lower part of the œsophagus, in only one the disease reached the stomach. In thirty-six cases in which there was a broncho-œsophageal fistula, the tissues surrounding the opening were thickened in every instance, whilst in thirteen there was distinct disease within the trachea. In seven other cases in which perforation had not taken place, there were nodular elevations of the lining membrane of the tracheo-bronchial canal. In the whole series of 100 cases perforation of the air-passages took place thirty-six times, the trachea being perforated twenty times, the right bronchus seven and the left bronchus four times, the base of the lungs in two instances, and the pleural cavity in one, whilst twice the perforation took place into the peri-œsophageal tissues. In my 100 autopsies the left recurrent nerve was found to be involved nine times, the right recurrent once, and in one instance both nerves were affected. It should, however, be remarked that all these eleven observations occurred among my own sixty patients (see Foot-note 5, p. 73), and it may be presumed that if this matter had been carefully looked into in the other forty cases, nerve-lesion would have been frequently met with.

Perforation of blood-vessels, according to Lebert,[2] is rare, whilst Rokitansky[1] in expressing a somewhat similar opinion, asserts that the aorta and right pulmonary artery are the vessels which most frequently yield. In addition to these vessels, the carotid,[2] subclavian,[3] vertebral,[4] œsophageal,[5] and superior intercostal[6] arteries may be mentioned as having been thus perforated.

---

[1] "Deutsche Chirurgie" von Billroth und Lücke. "Krankheiten des Pharynx und Œsophagus," von. Prof. König. Stuttgart, 1880, p. 69.

[2] Op. cit. p. 444.

I have met with two cases (Specimens 101 and 200, Throat Hospital Museum) in which abscess was developed in connection with the diseased mass in the gullet, and a further example of a similar complication has lately been reported by Dr. Semon.[7]

Diagnosis.—Although under ordinary circumstances the recognition of cancer of the œsophagus is easy, cases of doubtful nature occasionally present themselves. It is important, therefore, to determine at once whether the dysphagia be due to an extrinsic or an intrinsic cause. Laryngoscopic examination enables the observer to discard disease either of the pharynx or larynx as a possible factor, whilst the absence of swelling or tenderness in the neck will serve to eliminate most of the morbid conditions in that region which could give rise to compression of the gullet. When this is produced by deeply-seated tumours or abscesses, a bougie can be passed in most cases, but the pressure on the canal resulting from great enlargement, whether cancerous or fibroid, of the thyroid body, or from malignant deposit in the mediastinum, is sometimes sufficient to prevent the introduction of the finest instrument. In such instances, however, the external evidences and physical signs of the radical disease are generally obvious.

In aneurism of the aorta and in other affections of the circulatory system, there is seldom any difficulty in passing the œsophageal bougie, though force should on no account be used; the physical signs of aneurism are also generally discernible by auscultation and percussion. When it has been established that the disease is intrinsic, it must next be decided whether the dysphagia be organic or functional.

Spasmodic stricture is far more common in women than in men, and usually occurs under the age of forty. The symptoms are suddenly, not progressively, developed as in cancer. There is no pain or regurgitation of frothy fluid, though the mouthful of solid or liquid food may be immediately and forcibly ejected. A bougie can always be passed, though sometimes this can only be effected under the influence of an anæsthetic. There is seldom any considerable wasting, but on the contrary, the patient, though weak, is often plump. Collateral evidence, such as a markedly emotional disposition, may assist in the diagnosis.

---

[1] "Pathological Anatomy." Syd. Soc. Transl. London, 1854, vol. ii. p. 11.

[2] "Lancet," February 11, 1860.

[3] "Trans. Path. Soc." vol. xxii. p. 131.

[4] Ibid. vol. ix. p. 194; vol. xii. p. 108.

[5] Ibid. vol. xiv. p. 167.

[6] Ibid. vol. viii. p. 210.

[7] "Archives of Laryngology." 1882, vol. iii. p. 125.

Paralysis of the œsophagus generally occurs in the old and feeble—that is, in people whose muscular system is weak, or in cases of chronic wasting disease. The dysphagia is seldom extreme, and the easy passage of a bougie at once shows the absence of true stricture.

Passing to organic lesions in *syphilitic disease* there may be a clear history of infection or the acknowledgment of former symptoms, such as a skin eruption, falling of the hair, nocturnal pains in the shin-bones or the scars of former ulceration, either on the skin or mucous membrane; or coexistent disease of an undoubtedly syphilitic character may remove all doubt as to whether the system has been infected. Of course, cancer may occur in syphilitic individuals; but the curative effects of iodide of potassium in truly syphilitic cases, and the fact of its being virtually inoperative when cancer has been engrafted on syphilitic ulceration, will eliminate this source of difficulty. Narrowing of the canal, caused by *tubercular deposit*, being extraordinarily rare, and always secondary, requires only to be mentioned.

In *traumatic stricture* the history of the case explains its origin, but it may be added as a negative sign that in this class of cases the recurrent nerves are very seldom involved. In *chronic œsophagitis* the dysphagia is also much less marked than it is in carcinoma, and the inflammatory affection is not progressive. The food can, indeed, generally be swallowed, though with uneasiness, or even pain. On the other hand, the odynphagia is much more marked in chronic inflammation, and a bougie usually causes so much pain that it can only be passed under the influence of an anæsthetic.

In *simple dilatation* frequent regurgitation of unaltered food after a meal is a prominent symptom, and although there may be difficulty in passing a bougie, this can generally be overcome with perseverance.

Cancer of the pyloric orifice of the stomach is occasionally mistaken by the inexperienced for malignant disease of the œsophagus; but in the former complaint the food is generally retained for an hour or two, and, when brought up, has a decidedly acid reaction. Lastly, the diagnosis may be assisted by a careful consideration of the symptoms, which, taken together, are characteristic of cancer of the œsophagus: these are *progressive* dysphagia, expuition of a fluid, at first frothy, but afterwards thick, muco-purulent, and sometimes tinged with blood, obstruction to the passage of a bougie, frequent paralysis of one, and occasional paralysis of both abductors of the vocal cords, with progressive emaciation and debility occurring in a person over forty years of age.

Prognosis.—The course of the disease tends steadily towards a fatal issue, the opinion of Rokitansky,[1] based on the frequent appearance of certain cicatrices in the œsophagus, that cancer in this situation is often cured, being opposed to all other experience. In my 100 cases, the average duration of life after undoubted symptoms were developed was only eight months—the maximum being sixteen months, and the minimum five weeks. Each case, however, must of course be judged on its own merits. We must take into consideration the age of the patient, his previous health, and especially his temperament—persons of nervous organization generally resisting the slow starvation much longer than the phlegmatic. The duration of life is, however, dependent on such purely accidental conditions that it is never safe to give an opinion as to how long it may be extended. The gullet, which has remained partially pervious for months, may be suddenly completely blocked, or a perforation may occur without any warning.

When a perforation into the air-passages takes place, the patient seldom survives more than three or four weeks—unless he can be fed with a tube, when life may still occasionally be prolonged for a few months. If a considerable hæmorrhage occurs, and is arrested, its speedy recurrence must be looked for.

Apparent improvements are only of the most temporary character, and the recovery of the power of swallowing at a late period of the disease must not be regarded as a favourable symptom, but rather the reverse, indicating, as it usually does, sloughing of the growth or the mere giving way of spasm from increasing weakness.

Treatment.—In dealing with cancer of the œsophagus, we

[1] "Lehrbuch d. path. Anatom." 1855. Bd. i. p. 278.

have no satisfactory task, but something may be done to prolong life and more to assuage suffering. Local treatment is rarely of any use, but when the disease is situated at the orifice of the gullet, the growth may sometimes be in part destroyed by electric cautery, or removed with cutting forceps. I have also seen benefit from insufflations of a powder composed of one part of persulphate of iron to three parts of starch. This astringent application causes some shrinking of the growth, and thereby widens the canal. This effect, however, is, of course, only mechanical and temporary. Directly there is a suspicion of malignant disease the food should be most carefully selected. Milk, on account of its highly nutritive and unirritating character, should be regarded as the staple article of diet, but beef-tea, mutton broth (free, of course, from pepper or salt), eggs, arrowroot, or thin, soft farinaceous food may be given; stimulants should, if possible, be avoided, as they irritate the diseased surface. It is important to determine the circumstances which justify the use of bougies, and also to appreciate the conditions under which the feeding tube may be employed with advantage. In the first place, it must be distinctly stated that as long as the patients can swallow liquids easily, bougies should not be passed. When, however, fluid nourishment can only be got down with difficulty, and when that difficulty is steadily increasing, the time for instrumental interference has arrived, and the question arises whether an attempt shall be made merely to keep the œsophagus open, or whether the surgeon shall endeavour to enlarge the narrowing canal. At this period it will generally be found that only a No. 3, or at most a No. 4 (Author's scale, Vol. ii. Fig. 2, p. 11) can be passed, but sometimes a No. 5 or No. 6 can be got through. As a rule, the mere passage of a bougie from time to time is of little use, for it is found that progressively smaller sizes have to be employed, and that at the end of a few weeks no instrument will pass. Hence it is almost always desirable to attempt some dilatation. This should be done twice a week, and the surgeon must be satisfied if he can dilate to the extent of No. 8. If the passage of a bougie causes bleeding, instrumental treatment should be discontinued for a time. In any case, however, when dilatation has been practised for a few weeks, it is almost certain on one occasion or another to give rise to some inflammatory action within the gullet, and the patient may find that after the use of the instrument he is unable to swallow for many hours. After a few days' rest, however, liquids again pass, and mechanical treatment can be resumed.

In certain cases it may be possible to remove projecting portions of the growth, and so open a way for an œsophageal tube. By means of the œsophagoscope I was able on one occasion to carry out the line of treatment here suggested. The following are the details of the case:—

Mrs. B., aged sixty-two, was sent to me by Mr. Yate, of Godalming, on June 28, 1880, on account of difficulty of swallowing, which had commenced two years previously. She was able to take liquids easily, but could not swallow solids. The dysphagia gradually increased, and at the beginning of August, Mrs. B. could take liquids only with the greatest difficulty. At last, even liquids could not be swallowed. With the œsophagoscope a ragged projecting mass was seen about three inches below the lower border of the cricoid cartilage. On August 18, in the presence of Mr. Yate, Mr. Hovell, and Mr. Bailey (who administered chloroform), I succeeded in removing with the œsophageal forceps a piece of growth about the size of a cherry. The effect of the operation was most satisfactory. The patient felt some pain for two or three days, but a week after the operation she was able to swallow semi-solids with ease. Microscopic examination showed that the tumour was an epithelioma. Mrs. B. lived rather more than half a year after the operation, which may fairly be considered to have prolonged life for four or five months.

The œsophageal feeding tube (Vol. ii. Fig. 11, p. 24) may be used under two conditions: First, when the disease is complicated by spasm; and secondly, when there is a broncho-œsophageal fistula. In cases of spasm it is only when the muscûlar contraction is of a very enduring character—that is, when it lasts for the greater part of the day—that the feeding tube is required. Under these circumstances the patient should be placed fully under the influence of chloroform, and a pint of strong nutriment administered at least once in the twenty-four hours. When this process has been repeated for a few days the spasm often passes off, and the artificial feeding can then be discontinued.

It is, however, when a tracheo-œsophageal fistula has been established that the feeding tube is of special service. The train of symptoms by which the existence of the fistula can be recognized has already been described (p. 84). If the opening between the two tubes is small, although liquids when swallowed will pass through the aperture and give rise to violent coughing and choking, the point of the instrument will often glide over the orifice of the fistula, and thus allow the patient to be fed. When, however, the opening of the fistula is large, there is a risk of the feeding tube passing through it into the windpipe. Hence it is very important not to use force in introducing the tube, and the operator should be quite certain that the feeding tube has not found its way into a false passage before he injects any food. If the instrument has penetrated the windpipe some spasm is nearly sure to be set up, and the patient on coughing will force air through the tube, and thus demonstrate its position. In most cases of fistula, the feeding tube should be used as long as the patient survives, but sometimes the tracheo-œsophageal opening increases in size after a few weeks, and the tube can no longer be passed with safety. When the patient is quite unable to swallow, either from complete closure of the gullet, or from the establishment of a large fistula, the time for using nutritive enemata commences. It is a mistake to begin this method of feeding as long as the patient can get down any considerable quantity of liquid food, as it may irritate the bowel prematurely, and thus prevent rectal alimentation, when it might remain as a last resource. The patient should be fed with Leube's pancreatized meat (the formula for which I have slightly modified)[1] twice in the twenty-four hours. Should there be a difficulty in retaining the enemata (though the solid kind just mentioned causes far less irritation than the liquid injections, such as beef-tea or eggs beaten up in milk, which are commonly used), or should the food be returned without having undergone any digestive change, the permanent œsophageal tube (Vol. ii. Fig. 10, p. 22) may be introduced. It should be explained to the patient or his friends that the use of this instrument is attended with some danger, but that it may be the means of prolonging life for a few days—occasionally for a week or two, or even longer.

If thirst be greatly complained of in the last days, tepid footbaths of milk often comfort and refresh the patient, and possibly afford some slight nourishment.

The question of a cutting operation has been deferred to this late stage of the subject for the sake of clearness, but in actual practice it must be entertained directly the diagnosis of the disease is accurately established. Surgical measures, which at an early period may be attended with the happiest results, if postponed till the patient is worn out with disease, can only end in failure, and add to his sufferings. The point which has first to be considered is whether *excision* of the growth is practicable, the alternative operations being *œsophagostomy* and *gastrostomy*.

---

[1] See Vol. i. p. 580.

The idea of excising a portion of the gullet appears to have originated with Billroth,[1] who in 1872 published a short account of two experiments made on dogs. In each case a part of the œsophagus was cut out: one dog died five days afterwards from the result of an accident, but the other recovered completely, and lived for several months, when he was killed, in order that the parts might be examined. The first surgeon, however, so far as I am aware, who attempted to carry out this proceeding in the human subject was Kappeler,[2] who in 1875 endeavoured to excise a portion of the gullet in a man, aged forty-two, who had suffered from dysphagia for about eight months. The operator, however, was baffled by the extent and connections of the diseased mass, which also prevented him from opening the tube below the stricture. He had, therefore, to content himself with introducing a catheter into the œsophagus above the seat of disease, and trying to force a passage downwards. The patient died on the following morning. Resection of the œsophagus was again attempted by Kappeler[3] in 1876, but with no better result. The patient was a man, aged sixty-five, who had felt difficulty in swallowing for three years and a half. The main features of this case were almost identical with the one just related, as far as the operative procedures are concerned, and the result was equally unsatisfactory, as the patient died on the second day. A year or two later Prof. Czerny[4] was more fortunate. The patient in this instance was a woman, aged fifty-one, who had suffered from dysphagia for some months. Czerny made an incision from the level of the hyoid bone down to the sternum along the anterior edge of the sterno-mastoid on the left side; the omo-hyoid muscle was divided, the thyroid body was pushed upwards and inwards, and the œsophageal tumour, which could then be felt with the finger, was carefully dissected out. A segment of the gullet, involving the upper six centimetres of the canal, was removed, and the upper orifice of the lower section of the divided tube was stitched to the edges of the skin-wound. A catheter, through which the patient could be fed, was then passed into the œsophagus through the wound, and the lips of the superficial incision were brought together. By the fourth day all the sutures were removed, and the catheter was replaced by a large hollow bougie, which at first was left permanently *in situ*, but in a short time was taken out, and only introduced when nourishment had to be given. The patient learnt to feed herself in this manner, and five months after the date of the operation she was still in perfect health, without any trace of recurrence. She continued to use the sound for the purpose of taking food. On examination a partition about half a centimetre in thickness was found closing the lower aperture of the pharynx, thus cutting off all communication between the upper and lower parts of the pharyngo-œsophageal canal. In this instance the disease was epitheliomatous in character, and the mass encircled the gullet, but no perforation of the tube or extension of the growth beyond its walls had taken place, and there were no enlarged glands. Whilst, therefore, Prof. Czerny must be congratulated on the highly successful issue of his bold procedure,[1] the case itself was an exceptionally favourable one for the operation.

---

[1] "Langenbeck's Archiv. für klin. Chir." 1872, Bd. xiii. p. 66.
[2] "Deutsche Zeitschr. für Chirurgie." 1877, Bd. vii. p. 379.
[3] Ibid.
[4] "Beiträge z. operat. Chir." Stuttgart, 1878, p. 41.

The fact, however, that malignant disease of the gullet spreads to contiguous organs at an early period is likely to prevent the operation of resection being frequently applicable.

The surgeon has in the next place to take into consideration the chances offered to his patient by œsophagostomy or gastrostomy. The advantages and disadvantages of these procedures will be fully considered under the head of "Cicatricial Stricture of the Gullet," a condition which is much more favourable for such operations than where the narrowing is due to malignant disease.

SARCOMATA.

Sarcomata are occasionally met with in the œsophagus. Rosenbach[2] has reported a case in which a growth about the size of a common fowl's egg was attached to the right side of the gullet just below its junction with the pharynx. The tumour was soft, slightly lobulated, and almost transparent, closely resembling an ordinary nasal polypus. On microscopic examination, however, it was found to be a round-celled sarcoma. Tracheotomy having been first performed the growth was removed by subhyoid pharyngotomy. In another case, reported by Chapman,[1] several tumours, partially connected, varying from one and a half to two inches in diameter, were found occupying the upper orifice of the œsophagus.

---

[1] Whilst these sheets are passing through the press I learn from Prof. Czerny that the woman died rather more than a year after the operation described in the text. Recurrence of the disease took place to an extent which rendered tracheotomy necessary, and the patient succumbed some weeks afterwards (Private letter, dated July 22, 1882).

[2] "Berlin. klin. Wochenschrift," September 20 and 27, 1875.

Cases of calcification, cartilaginous stricture, and even ossification of the œsophagus are referred to by some of the older authors, such as Sampson,[2] Morgagni,[3] Gyser,[4] and Desgranges.[5] It is not improbable that calcification sometimes occurs in this situation,[6] but I know of no authentic instance of such a transformation recorded in modern literature.

---

[1] "Amer. Jour. Med. Sci." October, 1877, vol. cxlviii. p. 433.

[2] "Miscell. Curios." 1613, p. 170.

[3] "De sedibus et causis morb." Ep. xxviii. art. 15, ed. sec. Patavii, 1765, t. ii. p. 10.

[4] "De fame lethali ex callosâ œsoph. angustiâ." Argentorati, 1770, p. 16.

[5] "Journ. de Corvisart." 1801, t. iv. p. 203.

[6] Both enchondromata and osteomata have been found in the mucous membrane of the trachea, and though the normal presence of cartilage in the windpipe renders it a more likely locality for the development of these growths, it is quite possible that they may also occur in the gullet.

NON-MALIGNANT TUMOURS OF THE GULLET.

(SYNONYMS: BENIGN GROWTHS OF THE GULLET. POLYPI OF THE GULLET.)

Latin Eq.—Tumores non maligni œsophagi.
French Eq.—Tumeurs non malignes de l'œsophage.
German Eq.—Gutartige Geschwülste der Speiseröhre.
Italian Eq.—Tumori non maligni del esofago.

DEFINITION.—*Growths of benign character, generally mucous or fibro-mucous in structure, giving rise to nausea, sometimes to pain, occasionally to dyspnœa, and frequently to extreme dysphagia.*

History.—In 1717 Schmieder[1] published an example of polypus of the œsophagus, but I know no particulars of the case beyond those contained in the title-page of his essay.[1] In 1750 Vater[2] reported the case of a man who had suffered from dysphagia for some time. This improved after he had vomited a "fleshy mass about the size and thickness of a finger;" subsequently, however, the difficulty of swallowing recurred, and the patient sank from inanition. After death the walls of the œsophagus above the cardiac orifice were found thickened, the lumen of the tube being much narrowed. There was the appearance of a cicatrix on the œsophageal wall at this part. This seems to have been an example of simple polypus, which, as in Coats's case (see below) gave rise to chronic inflammation, and probably ulceration of the mucous membrane. The inflammatory changes were presumably too far advanced to permit the recovery of the patient after the spontaneous separation of the growth. In 1763 Dallas[3] met with a remarkable instance, in which the polypus had so long a stalk that on making the patient retch it was projected into the mouth as far as the front teeth. In 1764 De Graef[4] reported the case of a patient who died from inanition, in whose œsophagus was found a small cone-shaped growth, with its apex towards the cardiac opening. In 1776 Macquart[5] published an account of a tumour in the gullet, which does not seem to have been malignant. In 1784 Schneider[6] gave a description of a case in which three polypi were found in the gullet after death. Baillie,[7] in 1802, stated that he had seen a fibrous growth springing from the inner coat of the gullet. In 1806 Vimont[8] placed on record two examples of œsophageal polypi, both occurring in women who had long suffered from goître. Dubois,[9] in 1818, related an instance in which an œsophageal polypus had been ligatured, and the patient was suffocated from the tumour coming away in his sleep and finding its way into the air-passage. Rokitansky[10] related a case in which a very large polypus in the gullet caused little or no dysphagia. In 1847 Arrowsmith[11] described a pedunculated and freely movable polypus growing at the upper part of the gullet, and admitting of easy removal if the affection had been recognized. In 1857 Middeldorpf[12] having met with a remarkable example of the disease, and having collected a few previously published cases, wrote a monograph of considerable value on

---

[1] "Dissert. de polypo œsophagi vermiformi rarissimo e pulveris sternutatorii Hispani abusu progenito." Halæ, 1717.

---

[1] In a list of examples of œsophageal polypi given by Middeldorpf at the end of his essay ("De polypis œsophagi," Vratislaviæ, 1857, pp. 22, 23) cases are cited from Pringle, Gilbert, Waugh, and Lesueur. These, however, have not been included in the above history, as they were not true benign polypi. Pringle's case ("Med. Essays and Observations by a Society in Edinburgh." Edinburgh. 1737, 2nd ed. vol. ii. pp. 324, 325) was probably malignant; Waugh's (Ibid. vol. i. p. 274) was clearly an example of œsophageal abscess terminating in complete recovery after spontaneous rupture of the sac; whilst the growth in Lesueur's case ("Revue Méd.-Chir. de Paris," 1850, t. viii. p. 360) is distinctly stated by the reporter to have been encephaloid cancer.

[2] "Dissert. inauguralis de deglutitione difficili et impeditâ." Vitembergæ.

[3] "Edin. Literary and Phys. Essays," vol. iii. p. 525. This case is associated with the name of Monro, who saw the patient in consultation with Dallas, and suggested the ligature. It is related at length in Monro's "Morbid Anatomy of the Gullet," &c. 1830, 3rd ed. p. 426.

[4] "Diss. illustrans hist. de callos. excrescent. œsoph. obstruente." Altorfii, 1764.

[5] "Obs. sur une Tumeur dans l'Œsophage." Hist. et Mém. de la Soc. R. de Méd. 1776, Hist. p. 280.

[6] "Chirurg. Geschichte." Chemnitz, 1784, Bd. x.

[7] "Pathological Anatomy," p. 102.

[8] "Annales de la Soc. de Méd. Prat. de Montpellier," t. viii. p. 69.

[9] "Propos. sur l'Art de Guérir." Thèse de Paris, 1818, No. 104.

[10] "Œsterr. medicin. Jahrb." 1840, Bd. xxi.

[11] "Méd.-Chir. Trans." 1847, vol. xxx. p. 229.

[12] "De polypis œsophagi." Vratislaviæ, 1857.

RY 18...... ELEY

the subject. Since then examples of myomatous polypi in the œsophagus have been published by Eberth,[1] Coats,[2] Fagge,[3] and Tonoli,[4] whilst Wyss,[5] Ziemssen,[6] and Sappey,[7] have recorded the occurrence of small cystic tumours in the same situation. I have myself met with three examples of non-malignant growth in the gullet.

[1] "Virchow's Archiv." 1868, Bd. xliii. p. 137.
[2] "Glasgow Med. Journ." Feb. 1872.
[3] "Trans. Path. Soc." London, 1875, vol. xxvi. p. 94.
[4] "Gazetta Medica Ital. Lombard." 1880, Serie viii. t. ii. No. 49, p. 479.
[5] "Virchow's Archiv." 1870, Bd. li. p. 144.
[6] "Cyclopædia of Pract. Med." vol. viii. p. 161.
[7] "Traité d'Anatomie Descriptive." Paris, 1879, 3me ed. t. iv. p. 155.

Etiology.—These growths are very rare, and probably originate in most instances in chronic inflammation. As far as the recorded cases go, it would appear that œsophageal polypi are more common amongst men than amongst women. In De Graef's case the patient had been a free drinker, and had frequently suffered from inflammation of the throat and tonsils, but none of the others show a similar history. As regards myomata, it was to be expected, *à priori*, that they would be occasionally met with in a muscular canal like the œsophagus.

Symptoms.—The most frequent symptom is slowly increasing dysphagia. The disease, however, may exist for many years, as in Rokitansky's case, even when the growth is very large, without interfering with deglutition, until an advanced period of its development. Sometimes no symptom whatever has been observed, and the tumour has only been discovered after death.[1] In other cases the dysphagia has been attributed to cancer.[2] These growths are often pedunculated, and the stalk may be so long that, as in Dallas's patient, the polypus, in retching, may be projected into the mouth. Sometimes it may be seen with the laryngoscope, at the lower part of the pharynx; and in one instance, hereafter reported, I was able, by means of the œsophagoscope, to obtain a view of a growth situated about one inch below the cricoid cartilage. A bougie can occasionally be passed and withdrawn without difficulty, although the operation may cause severe pain, as in Coats's case. On the other hand, in some instances, an obstruction may be perceived in using the instrument, or it may be impossible to pass it at all. In Tonoli's case a movable tumour could be distinctly felt with the bougie. Sometimes the tumour has been known to give rise to dyspnœa and indistinctness of utterance,[3] and in one instance great pain was experienced; but in this case (Coats's) the pressure of the growth had induced extensive ulceration of the œsophageal walls, and the pain was probably due to this condition. Middeldorpf's patient complained of severe pain in the fauces and in the back.

---

[1] Schmieder; Fagge. [2] Coats. [3] Dallas.

In one case (Vater's) the growth separated spontaneously, and was ejected by the mouth; but even in this instance, as already remarked, the patient died from inanition, apparently owing to the chronic inflammation which had been set up by the growth.

Pathology.—The most common kinds of non-malignant growths met with in the œsophagus are those of a simple warty or *papillary* structure. "They are sometimes single, at other times in large numbers, scattered over the whole length of the tube."[1] Small *cysts*, containing a clear colourless viscid fluid, are occasionally found;[2] they probably originate from obstructive distension of the mucous follicles. Wyss[3] has described a case in which a cyst was situated on the posterior wall of the œsophagus one and a half centimetres from the cardia. It was of the size of an apple, and was filled with liquid, which was found, on microscopic examination, to contain globules of free mucus and ciliated epithelium. Sappey[4] states that he has on several occasions seen cysts in the gullet, and he describes one case in which there were about twenty small cysts, varying from ten to twelve millimetres in length. *Fibromata* are also met with, and often attain a much larger size than the growths already described. They are usually single, but occasionally multiple. In Schneider's case, as already remarked, three polypi were found after death. These tumours vary in size from a currant to a hazel nut, but sometimes attain much larger proportions. In Rokitansky's case the polypus measured seven and a half inches in length, and its broadest part was two and a half inches in thickness. The mucous membrane covering the growth is generally smooth, but sometimes it is rough, and covered with papillæ. In Baillie's case the surface of the growth was considerably ulcerated. In the well-known instance reported by Middeldorpf the exact origin of the growth was not ascertained. It may have grown from one of the ary-epiglottic folds or from the posterior part of the cricoid cartilage, or from the upper part of the œsophagus.

---

[1] "Ziemssen's Cyclopædia," vol. viii. p. 168.

[2] Ibid. Also Fagge: Loc. cit.

[3] Loc. cit.

[4] Op. cit. t. iv. p. 155. Foot-note.

On making the patient vomit, a large purple body, which at first appeared to be the tongue, was thrown forwards against the teeth. The tumour, which was ligatured, and then removed, was three inches long, and half an inch wide; it was smooth and glistening, somewhat uneven and warty at the lower part, and superficially ulcerated. It had a covering of pavement epithelium, beneath which were conical papillæ, and under these again was embryonic connective tissue. In Tonoli's case the growth was oblong in shape, and was attached by a short stalk to the left side of the gullet at the lower part of its middle third.

Weigert[1] has reported a case of *adenoma polyposum* about the size of a hazel nut, which grew from the anterior wall of the lower third of the œsophagus. It contained numerous hollow spaces, lined with cylindrical epithelium, and surrounded by a stroma of connective tissue. Zenker and Ziemssen,[2] in commenting on this case, remark that it probably originated in the mucous follicles.

Lipomata are stated by Laboulbène[3] to be occasionally found in the œsophagus, but he does not refer to any actual cases.

As already stated, examples of *myomata* have been recorded by Eberth, Arrowsmith, Coats, and Hilton Fagge. In the last-mentioned case the patient, who was under the care of Mr. Bryant, died from the effects of an injury to the knee-joint, and there was no mention of dysphagia in the clinical history. The tumour grew from the anterior wall of the œsophagus just below the level of the bifurcation of the trachea. It was about two inches in length, one and a quarter in width, and one inch in thickness. In Coats's case the patient was a man, aged sixty-one, and the growth was elongated and irregularly oval in shape. It was attached to the posterior wall of the œsophagus six inches and three-quarters below the level of the glottis by a thin fibrous pedicle, one inch and three-quarters long, which was inserted into the body of the tumour two inches below its upper end. The polypus measured four inches and three-quarters from above down, two from side to side, one to one and a quarter from before backwards. The surface was irregularly lobulated, generally greyish in colour, but of dark brown tint at the upper part. The body of the tumour was horizontally constricted, the upper part being larger than the lower. Portions of the surface had an appearance of sloughing. On section the growth was tough, but not very dense. The œsophagus was dilated near the seat of implantation of the polypus, and its surface was of a slaty colour, and ulcerated in several parts, two of the ulcers having eaten through the mucous coat, and one through the entire thickness of the gullet-wall.

---

[1] "Virchow's Archiv." 1876, Bd. lxvii. pp. 516, 517.

[2] "Cyclopædia," vol. viii. p. 169.

[3] "Nouv. Élém. d'Anat. Pathol." Paris. 1879, p. 91.

Diagnosis.—There is considerable difficulty in diagnosing these tumours, for as has been observed, they sometimes give rise to no symptoms at all, whilst in other instances they produce almost the same symptoms as malignant growths. As compared, however, with cancer, the dysphagia, as a rule, progresses much more slowly, and it may be years before it gives rise to serious inanition. When the growth has a long pedicle it may be occasionally protruded into the mouth, and in other cases it may be seen with the laryngeal mirror or with the œsophagoscope. Careful examination of the neck and chest will eliminate cervical and mediastinal tumours.

Prognosis.—The prospects of the patient must depend on the situation of the growth, on its size, and on the rapidity of its increase. Small warty growths need give rise to no anxiety, but if the polypus be large it must be looked upon as a serious disease, which at any moment may so much interfere with deglutition as to bring the patient's life into immediate danger.

Treatment.—When the tumour is projected into the mouth it may be ligatured and cut off. This course, as already mentioned, was pursued by Middeldorpf, whilst in the earlier case of Dallas a ligature was applied, the polypus was again swallowed, and allowed to come away *per anum*. In this instance, owing to the dyspnœa that was produced when the polypus was vomited into the mouth, it was necessary to perform tracheotomy as a preliminary measure. When a ligature has been applied it is highly desirable that the patient should remain under close observation, as in one case in which separation occurred during sleep, the growth became impacted in the pharynx and caused fatal apnœa.[1] In two cases that came under my own care some years ago, in which I had not diagnosed the growth, polypi were removed with the parasol-probang, which was used because the patients were under the impression that they had foreign bodies in their throats. In a more recent instance I was fortunately able, by means of an œsophagoscope, to diagnose a small polypus situated about one inch below the upper orifice of the œsophagus, and to remove it with forceps.

---

[1] Dubois: Loc. cit.

Should a growth, which cannot be removed *per vias naturales*, occupy the upper part of the gullet, recourse should be had to œsophagotomy, whilst if the tumour be in the lower part of the tube, gastrostomy offers a prospect of permanent relief.

CASES OF NON-MALIGNANT GROWTH IN THE GULLET.

Case 1.—Mrs. M., aged thirty-seven, was sent to me by Mr. Symonds, of Oxford, in March, 1874. She had felt some difficulty in swallowing for eleven months; but during the eight weeks previous to her coming under my observation, the dysphagia had become intensified to such a degree that she could take only liquid nourishment. The patient stated that she had lost flesh, and she was afflicted with a troublesome cough. Laryngoscopic examination showed that her larynx was healthy, and no sign of disease could be found in the lungs. From the fact that she had first noticed a difficulty in swallowing whilst eating hashed pheasant, Mrs. M. was under the impression that a bone had stuck in her throat. A bougie (No. 10 English measure) was passed with some trouble, a hitch having been felt in the upper third of the gullet. Two days later I introduced a parasol-probang, and on withdrawing it with a little difficulty, a round smooth growth of about the size of a marble, with a pedicle half an inch in length was brought up with the instrument. The patient spat up two or three drachms of blood, and next day was unable to swallow even liquids. On the second day, however, the dysphagia had abated, and by the end of a week it had quite passed off. I saw this lady again in 1875, and she had experienced no further difficulty in deglutition. On microscopic examination the growth proved to be of true fibrous structure, the fibrillæ being arranged concentrically round a white nuclear portion, and the whole being covered with squamous epithelium.

Case 2.—The Rev. P. E., aged forty-seven, consulted me in June, 1875, on account of difficulty of swallowing. This symptom was first noticed two years and a half previously, after eating some fish, and the patient attributed the trouble to the lodgment of a bone. The difficulty in swallowing had increased by slow but not regular degrees. At first it was slight, and only came on occasionally, whilst at other times the food went down perfectly well. During the first six months of 1874 the dysphagia passed off, but in the beginning of July of that year it suddenly returned, and since then there had always been some trouble. The patient stated that he had consulted several practitioners, and on two occasions attempts had been made to pass a bougie, but he was under the impression that the instrument had been stopped in the upper part of the throat. These measures had not given him any relief. At the patient's urgent solicitation, rather than with the idea of meeting with any foreign body, I passed a parasol-bougie. Though it went down easily, I had some difficulty in pulling it up, and was about to release the web of the bougie, when the obstruction suddenly yielded, and on withdrawing the instrument a small pedunculated tumour, about the size of a bantam's egg, fell from the patient's mouth. He subsequently brought up about a teacupful of blood. I forbad the patient taking any solid food, but this injunction was scarcely necessary, as for several days he experienced considerable pain even in swallowing liquids. There was no return of the bleeding. The patient ultimately made a good recovery, and I heard in January, 1878, that he was perfectly well. The tumour was of somewhat oval shape, though one side was very much flattened, and the surface ulcerated. On microscopical examination made by Dr. Stephen Mackenzie, it was found to be of fibrous structure, but covered, except at the ulcerated point, by pavement epithelium.

Case 3.—Miss P., aged twenty-seven, consulted me in August, 1880, on account of difficulty of swallowing, which had existed more or less for six or seven years. Examination with the œsophagoscope revealed an oval, semi-transparent polypus, situated on the right of the gullet, one inch below the cricoid cartilage. On August 28, in the presence of Mr. C. L. Taylor, I removed a growth about the size of a white currant. The patient felt some slight pain for twenty-four hours after the operation; but at the end of a week she was able to swallow perfectly, and has not since had any recurrence of the symptoms. The following is the report of Dr. Stephen Mackenzie on the specimen:—"The surface of the growth is covered with squamous epithelium, beneath which is a very lax œdematous and highly vascular mass with numerous lymphoid cells (leucocytes) infiltrated into the tissue. It appears, in fact, to be a polypus arising from chronic inflammation of the œsophageal mucous membrane."

SYPHILIS OF THE GULLET.

Latin Eq.—Syphilis œsophagi.
French Eq.—Syphilis de l'œsophage.
German Eq.—Syphilis der Speiseröhre.
Italian Eq.—Sifilide del esofago.

DEFINITION.—*Constitutional syphilis manifesting itself within the gullet by the usual secondary or tertiary lesions, or more rarely occurring in the congenital form, causing dysphagia and occasionally leading to death by marasmus.*

History.—Severinus,[1] who lived in the latter part of the sixteenth and the first half of the seventeenth centuries, appears to have been the first writer who called attention to this disease, and his contemporary, Rhodius,[2] recorded the case of a patient suffering from syphilis, in whom a growth was found originating from cicatricial thickening at the lower end of the œsophagus. Ruysch,[3] who flourished somewhat later, gave an account of a case treated by himself and Boerhaave, in which very severe dysphagia, due apparently to some obstruction at the level of the fifth or sixth dorsal vertebra, yielded to a short course of mercurial baths.[1] In 1820 Palletta[2] described an example of dysphagia occurring in a patient who had previously suffered from syphilis; the difficulty of swallowing came on on two occasions, and each time readily yielded to mercurial treatment. The first mention of congenital syphilis in the œsophagus was made by Billard,[3] who found ulcers which he considered to be of specific character, in the gullet of a girl six days old. In recent years a few additional examples of œsophageal syphilis have been observed. In 1860, West,[4] of Birmingham, published two cases which settled the question as to the occurrence of syphilis in the œsophagus. He also quoted three other supposed examples of the same disease, two from Carmichael, and one from Turner. From a careful perusal of the notes, however, it appears that in all these instances the disease was situated in the *pharynx*. West[5] soon afterwards related a third example occurring within his own experience, in which a woman, suffering from rupia and ulceration on the face and legs, died from marasmus, consequent on inability to swallow. Follin[6] refers to two cases which had come under his notice. In one there was palmar psoriasis and dysphagia; the latter symptom disappeared without instrumental treatment. In the other the lesion was probably more severe, and only a partial cure was effected. Virchow[7] states that he has in his possession two specimens illustrating the disease. In one of them he describes a softened gumma closely connected with a contracting cicatrix in the œsophagus. In the other case the preparation shows a flat ulcer with a "fatty indurated base." Wilks and Moxon[8] affirm that they have seen in a *syphilitic subject* two yellowish gummatous patches in the œsophagus, and in another instance they describe the gullet as having been penetrated by a large soft syphilitic deposit originally outside it. The same authors also allude to a specimen showing a contracted cicatrix in the œsophagus, which they consider to be probably due to syphilitic lesion. Knott[9] has added two cases. One of them—a specimen of ulceration of the œsophagus—was brought before the Pathological Society of Dublin in 1839 by Cusack. In another case that had come under Knott's own notice, severe œsophageal dysphagia occurred in a patient suffering from tertiary syphilis who quickly recovered the power of swallowing under the use of iodide of potassium. In 1868 Steffen[10] recorded two cases of ulcers of the œsophagus found in children suffering from congenital syphilis. In 1870 a case was published by Maury,[11] of Philadelphia, in which syphilitic stenosis of the gullet rendered gastrostomy necessary. In 1873 Podrazki[12] described a case in which a man who had suffered from severe tertiary syphilis experienced difficulty in swallowing during more than two years; gradual dilatation was tried without success, but great benefit was afforded by mercurial inunction. After death a cancerous stricture was found, but from the long duration of the symptoms, and the temporary good effect of the anti-syphilitic remedy, it is probable that the affection was venereal at least in the earlier part of its course. In 1874[1] I recorded a case of probable syphilitic ulceration of the œsophagus which had caused dysphagia on previous occasions, and which was relieved by iodide of potassium. In the following year an example of œsophageal syphilis was related by Godon.[2] The patient, a man aged twenty-four, recovered rapidly under the use of iodide of potassium and ice. In 1876 Reimer[3] published a case of congenital syphilis occurring in a boy of twelve; besides many other lesions, there was a sinus opening on the surface of the neck and leading into the œsophagus. The tissues of the gullet for some way round the ulcer were diseased. In 1877 Bryant[4] related an instance of œsophageal stenosis occurring in a tubercular subject, which he considers to have been due to syphilitic ulceration. The dysphagia was so severe that gastrostomy was judged necessary. In the same year Luton[5] gave a brief account of a case in which a man aged forty, suffering from syphilitic disease of the gullet which had resisted treatment by mechanical dilatation, was speedily and permanently cured by iodide of potassium. A case has been reported by Billroth[6] in which serious difficulty of swallowing was caused by syphilitic deposit behind the cricoid cartilage. The patient, a man aged fifty-five, had condylomata in the mouth and on the tongue. The dysphagia yielded promptly and permanently to anti-venereal remedies combined with mechanical dilatation.

---

[1] Quoted by Lieutaud: "Hist. Anat. Med." Parisiis, 1767, t. ii. lib. iv. obs. 105.
[2] "Obs. Anat. Med." Patavii, 1657, Cent. ii. obs. 46.
[3] "Advers. Anat. Med.-Chir." Amstelodami, 1717. Decad. i. obs. x. p. 24, et seq.

---

[1] Haller has been quoted (Follin, "Rétrécissements de l'Œsophage." Paris, 1853, p. 30) as describing a case of syphilitic stricture of the gullet which was cured by the use of mercurial pills. On reference to the original report, however, ("Opuscula Pathologica," obs. lxxviii. in Haller's "Opuscula Minora," Lausannæ, 1768, t. iii. pp. 380, 381), I can find no evidence whatever, either that the disease was venereal or that Haller considered it to be so.

[2] "Exercit. Pathol." Mediolani, 1820, p. 226, et seq.

[3] "Traité des Maladies des Enfants nouveau-nés." Paris, 1838, p. 307.

[4] "Dublin Quarterly Journ. of Med. Science." Feb. 1860, No. 57, p. 86, et seq.

[5] Ibid. Aug, 1860, vol. xxx. p. 29, et seq.

[6] "Traité Élém. de Pathologie externe." Paris, 1861, t. i. p. 696.

[7] "Die Krankhaften Geschwülste." Berlin, 1864-65, Bd. ii. p. 415.

[8] "Pathological Anatomy." London, 1875. 2nd ed. pp. 365, 366.

[9] "Pathology of the Œsophagus." Dublin, 1878, p. 161.

[10] "Jahrb. für Kinderheilk." vol. ii. p. 144.

[11] "Amer. Journ. Med. Sci." April, 1870, p. 356.

[12] "Wien. Med. Wochenschr." 1873, Nos. 33, 35, 36.

[1] "Lancet," May 30, 1874.
[2] "Archives of Dermatology." 1875, vol. i. p. 276.
[3] "Jahrb. f. Kinderheilk." vol. x. p. 98. [4] "Lancet." 1877, vol. ii. p. 9.
[5] "Nouv. Dict. de Méd." Paris, 1877, t. xxiv. pp. 403, 404.
[6] "Clinical Surgery." Syd. Soc. Transl. London, 1881, p. 128.

Etiology.—When the system has become infected with the venereal poison, local manifestations may take place in any part of the body. The œsophagus, however, shows comparatively little proclivity to syphilitic affections, and is probably attacked only when previous disease or injury has produced a *locus minoris resistentiæ* at some point in the canal. Hereditary syphilis probably shows itself but seldom in the gullet; indeed, I know of no cases but those of Billard, Steffen, and Reimer, above referred to, in which this form of the affection has been actually observed.[1]

Symptoms.—The chief of these is dysphagia, which, in its mode of development, greatly resembles that due to swallowing an irritant or mild corrosive poison. Thus, difficulty of deglutition occurs at the time the ulcer forms, disappears as it heals, and recurs when the cicatricial tissue begins to shrink.

---

[1] It was formerly believed that congenital syphilis of the larynx was extremely rare, but the recent researches of Dr. John Mackenzie, of Baltimore ("Amer. Journ. Med. Sci." October, 1880), have proved this condition to be of more frequent occurrence than was previously supposed, and if the gullet could be thoroughly examined during life in patients suffering from congenital syphilis, this canal also would probably be found to be affected much more often than is generally suspected.

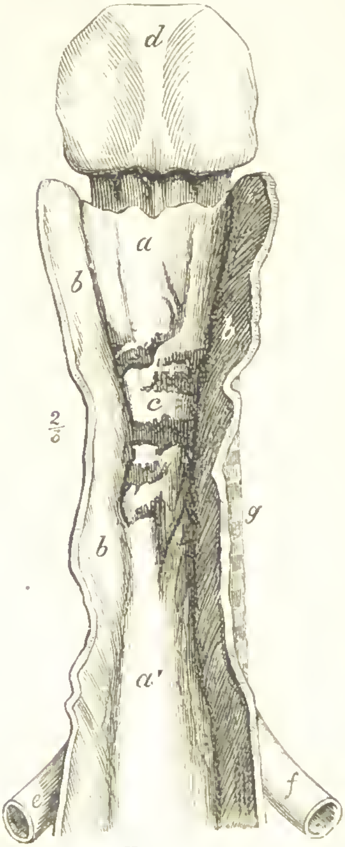

FIG. 14.
SYPHILITIC CICATRICES IN THE ŒSOPHAGUS.
(SEEN FROM BEHIND.)

a and *a′*, anterior wall of gullet; *b*, sides of the gullet thrown outwards; *c*, situation of transverse ridges of cicatricial tissue (above and below them vertical ridges are seen); *d*, posterior surface of cricoid cartilage (between *d* and *a* a portion of the posterior wall of the trachea is visible); *e*, left, and *f*, right bronchus; *g*, edge of trachea.

Pathology.—The morbid changes closely resemble those met with in the pharynx and larynx—that is to say, simple ulceration of the mucous membrane may take place: or gummata may be formed in the submucous tissue, which slowly break down, ulcerate, and give rise to rigid contracting cicatrices.[1] In my first case there was a single raised cicatricial band just below the cricoid cartilage. It was nearly half an inch in width, and ran round the tube for three-fourths of its circumference, reducing the canal to the size of a No. 3 œsophageal bougie (old English scale). In my second case (Fig. 14) slightly raised transverse ridges occupied the anterior wall of the gullet one inch and a half below the cricoid cartilage, the upper and lower bands giving off short vertical spurs. There was very little thickening of the walls of the gullet except immediately beneath the cicatricial bands. In one of West's cases the œsophagus was constricted four inches below its upper orifice for about two inches and a half, and the narrowed portion, owing to thickening of the mucous membrane, and fibrous deposits in the form of bands and ridges, presented very much the appearance of an old stricture of the urethra. In another case reported by West the œsophagus presented reddish livid erosions for about two inches above the cardiac orifice, and there was a considerable amount of fibrous deposit in the submucous tissue. Laboulbène[1] found in the gullet of a man, aged thirty, who had died of acute œdema of the larynx caused by an ulcerated growth in that situation, scars of old ulcers and interstitial deposits of a hard whitish fibroid material which infiltrated the mucous membrane. All who saw it agreed that it was of gummatous nature.

---

[1] Berkeley Hill: "Syphilis and Local Contagious Disorders," 1868, p. 127.

Diagnosis.—The diagnosis of syphilitic disease of the gullet is extremely difficult, and under the most favourable conditions can never amount to anything more than conjecture. The affection presents no pathognomonic feature, and the surgeon can only come to a probable conclusion by a consideration of all the circumstances of the case. The history of the patient must always be carefully investigated. Inquiries should be made as to the previous occurrence of skin eruptions, loss of hair, miscarriages, nocturnal pains in the shin-bones, and the various other symptoms indicative of constitutional syphilis. The skin, tongue, pharynx, and larynx should be carefully examined to see if there are any old scars or patches of induration; nodes should be sought for on the front of the tibia, and the condition of the sub-occipital glands should be ascertained. The duration of dysphagia for some time, its apparent complete cure by anti-venereal remedies, and its subsequent recurrence, are the salient features of the malady.

It is not to be wondered at, however, that in a matter so beset with difficulties, observers are often led astray. It is likely that in many instances syphilis of the gullet has been mistaken for cancer, and, on the other hand, erroneous conclusions may be arrived at even when the history and course of the complaint seem most clearly to indicate a specific origin. Thus, in a case of dysphagia which came under my own notice, I supposed the symptom to be one of syphilitic lesion at the upper part of the œsophagus. This was rendered more probable by the fact that the patient was suffering from a well-marked venereal affection of the pharynx. After death, however, absolutely no trace of disease could be seen in the gullet, and the difficulty of swallowing was found to have been due to great enlargement of the posterior part of the cricoid cartilage.

---

[1] "Nouv. Élém. d'Anat. Pathol." Paris, 1879, p. 96. The same writer also states that he had met with an example of stricture of the gullet in which a woman suffering from tertiary syphilis was cured by iodide of potassium, and refers to two similar cases related to him by Fournier.

Prognosis.—This is very unfavourable, for though when the lesion only amounts to superficial ulceration the patient can generally be relieved by treatment, there is a great probability of permanent stricture resulting from subsequent cicatricial contraction. Although this may be sometimes combated for a time by the use of bougies, it very often happens that as soon as the patient feels a slight improvement in his condition he will discontinue his attendance, and when he again presents himself it may be impossible to pass an instrument. When a large gumma forms, or when the walls of the gullet become much thickened, the prospects of the patient are still more gloomy.

Treatment.—The constitutional remedies which are suitable in other forms of tertiary syphilis may be employed here. When the presence of gummata or specific ulcers is suspected, iodide of potassium, in doses of ten grains three times a day, will probably quickly relieve all the symptoms. Ammonia, which is so useful in combination with this drug, should not be given in these cases, as it is apt to irritate the gullet. Should frequent relapses take place, bichloride of mercury (one-sixteenth of a grain) twice or three times a day, or the cyanide of mercury (one-eighth of a grain) may be found beneficial.

The proper treatment of the actual constriction of the œsophagus will be considered under "Cicatricial Stricture of the Gullet."

The first two of the following cases were undoubtedly examples of syphilitic disease of the œsophagus, and the last one probably belongs to the same category:—

Case 1.—Sarah H., a married woman, aged forty-one, applied at the Throat Hospital in June, 1874, on account of difficulty in swallowing. She stated that she had had three miscarriages. There was a large rupial eruption over the right shin-bone. Careful examination of the pharynx and larynx gave negative results; but on attempting to explore the gullet it was found impossible to pass the bougie beyond the upper orifice of the canal, even when the patient was under chloroform. Iodide of potassium was given, liquid diet of highly nutritious quality was obtained for her, and she was directed to wean an infant which she was suckling. In a few weeks Sarah H. had so far recovered as to be able to swallow semi-solid food. She thereupon discontinued her attendance. In February, 1875, however, word was brought to the hospital that she was dying. Mr. Poyntz Wright saw her several times, but in spite of every effort to overcome the obstruction, her œsophagus was found impermeable, and she soon died from exhaustion. After death the canal, about an inch below the cricoid cartilage, was found so much narrowed that a No. 3 bougie (old English scale) could with difficulty be passed into it. The contracted portion extended downwards for less than half an inch in a vertical direction, and consisted of a raised ridge, occupying three-fourths of the circumference of the tube. Two whitish nodules, presenting all the appearance of syphilitic gummata, one about the size of a filbert, and the other somewhat smaller, were found in the liver.

Case 2.—John W., aged sixty-five, came to me at the Throat Hospital in July, 1876, on account of dysphagia. He had suffered from primary syphilis seven years previously, and his palate had been perforated by an ulcer in 1874. The patient was much emaciated, and very feeble; he had also paresis of the left arm. Examination of the pharynx showed no signs of the disease, and the larynx was healthy, with the exception of slightly impaired mobility of the left vocal cord. The patient could not swallow solids at all; but liquids went down pretty easily. On auscultation of the gullet prolonged gurgling noises were heard over the sixth and seventh vertebræ, whilst below that point the œsophageal sounds were scarcely audible. An attempt to pass a No. 6 bougie (old English scale) altogether failed, owing to obstruction just below the cricoid. Stricture was diagnosed, and it was thought that the disease might be syphilitic. No improvement, however, was produced by iodide of potassium; the dysphagia gradually got worse, and the patient died in January, 1877. Post-mortem examination showed fine, slightly raised, almost transverse ridges on the anterior wall of the gullet (Fig. 14). The uppermost ridge was about an inch and a half below the lower border of the cricoid cartilage, and from it two spurs passed upwards. The lowest transverse ridge also sent a prolongation downwards. These ridges were darker in colour than the rest of the mucous membrane, and presented an uneven surface. The walls of the gullet were very little thickened, except just beneath the ridges.

Case 3.—A man, aged sixty-one, came under my care in June, 1873. He had suffered since the foregoing February from dysphagia, which had gradually become worse, till, when I saw him, he could only swallow fluids. He had had venereal disease eighteen years before, and had on two different occasions since then suffered from difficulty of swallowing. One of these attacks had occurred eleven and the other four years previously. There was neither cough nor expectoration, and the pharynx appeared healthy, with the exception of a slight cicatricial puckering on the right anterior pillar of the fauces. The larynx was normal. On auscultation of the gullet, however, the "morsel" was found to be arrested at a point opposite the sixth dorsal vertebra, and on exploration with the bougie a tight stricture was recognized about the junction of the lower with the two upper thirds of the gullet. Iodide of potassium was given, and in ten days the patient had recovered his power of swallowing.

Although the evidence in this case amounts to no more than probability, I think it may be accepted as a genuine example of syphilitic stenosis. The previous history of the patient, and especially his rapid recovery under iodide of potassium, point clearly to such a conclusion.

TUBERCULAR DISEASE OF THE GULLET.

This affection is characterized by the secondary deposit, in the mucous membrane of the œsophagus, of tubercles, which break down in the ordinary way and end in ulceration. It is only in comparatively recent times that this disease has been recognized. The first mention of it appears to have been made by Andral,[1] who speaks of finding tubercles beneath the œsophageal mucous membrane. Some years later a case was reported,[2] in which tubercles were found at the upper part of the gullet. In 1851 Oppolzer[3] referred to tubercle of the œsophagus as a pathological curiosity. An instance of the affection was recorded by Willigk,[4] in 1854, and ten years later Maisonneuve[5] related an example of stricture of the upper part of the gullet, caused by tubercular infiltration. In 1868 a conclusive case was published by Chvostek,[6] and a doubtful one by Paulicki.[7] Zenker and Ziemssen[8] briefly allude to two cases which "they believe could be called tubercular." One of these, however, appears to have been merely an example of caseous peri-œsophageal glands perforating the gullet. The account of the other case is so meagre that it is impossible to arrive at any independent opinion as to its nature. In both instances the microscopic examination gave only negative results. Knott[9] quotes a case which was reported to the Pathological Society of Dublin by Professor R. W. Smith. Laboulbène[10] states that he has met with two instances of the disease, of which he had unfortunately neglected to keep notes. The etiology of the disease is obscure, the well-known tendency of tubercle to become developed in various organs after its primary deposit in the lungs being manifested only to a very slight extent in the œsophagus. No satisfactory evidence of the primary occurrence of tubercle in this situation has yet been produced, though in the case quoted by Knott the dysphagia was present some months before there was any evidence of pulmonary mischief. I have myself never seen an example of the disease. It is probable, however, that it is more common than the small number of recorded cases would lead us to suppose, and I have little doubt that examples of it will be more frequently met with as the pathology of the gullet comes to be more closely studied.

---

[1] "Précis d'Anat. Pathol." Paris. 1829. t. ii. p. 274.
[2] "Würtemberg Med. Corresp. Blatt." 1844, Bd. xxiii.
[3] "Wien. Med. Wochenschrift." 1851, Nos. 2. 5, and 12.
[4] "Prag. Vierteljahrschr." 1854, lx. 4.
[5] "Clinique Chirurgicale." Paris, 1864, t. ii. p. 410.
[6] "Œsterr. Zeitschr. für prakt. Heilk." 1868. xiv. 17 and 18.
[7] "Virchow's Archiv." 1868. Bd. xliv. pp. 373-375.
[8] "Cyclopædia of Pract. Med." vol. viii. p. 191.
[9] "Pathology of the Œsophagus." Dublin. 1878. p. 215.
[10] "Nouv. Elém. d'Anat. Pathol." Paris. 1879, p. 95.

From the few cases on record this affection would appear generally to occur in middle life or old age, and it has not hitherto been met with in children. The only *symptoms* are dysphagia and odynphagia, the former being generally the more marked. In Chvostek's case the patient, a man aged forty-three, was attacked by acute pulmonary tuberculosis in April, 1865; pain and difficulty in swallowing came on in January, 1866, and the patient died a week or two later. Paulicki's patient began to suffer from dysphagia two months after the first signs of lung disease showed themselves, and death was very gradual.

The *pathological* changes vary greatly in different cases. In that of Chvostek pleurisy, pulmonary tubercle, and enlargement of the liver were found, but there was no intestinal ulceration. The mucous membrane of the gullet was smooth and unbroken at the upper part, but downwards from the level of the third dorsal vertebra there were numerous ulcers of various shapes with sharp-cut edges. In some instances the ulcers had a smooth, in others a villous, base of dark grey colour. Over their surface were scattered whitish-yellow nodules, from some of which a thick yellowish purulent fluid could be squeezed out. The character of the ulcers in this instance was established microscopically by Professor Engel, whilst in Paulicki's case the tubercular origin of the œsophageal lesions was rendered probable by the history of the disease although microscopic examination failed to prove it. Here, together with signs of old pleurisy, a suppurating cavity was found in the left, and some caseous deposits in the right apex. In the gullet, at the level of the cricoid cartilage, there was a stricture; and on the posterior wall were two ulcers, one of them being half an inch in length and reaching through the entire depth of the mucous membrane, which was congested for some distance round.

The *diagnosis* of this affection from cancer of the œsophagus must rest chiefly on the fact that the dysphagia is not regularly progressive; there is probably, too, in most cases abundant evidence of tubercular deposit in the lungs. The fact that malignant disease of the gullet occasionally coexists with tubercle of the lungs must not, however, be forgotten, and hence, even when there is undoubted evidence of pulmonary phthisis, it cannot be absolutely determined that the œsophageal disorder is of similar nature.

As the disease has not hitherto been detected during life, nothing can be said as regards *prognosis*. The affection can only be *treated* symptomatically; if there be much pain in swallowing, hypodermic injections of morphia should be given.

DILATATIONS OF THE GULLET.

(SYNONYMS: DIVERTICULA. POUCHES.)

Latin Eq.—Dilatationes œsophagi.
French Eq.—Dilatations de l'œsophage.
German Eq.—Erweiterungen der Speiseröhre.
Italian Eq.—Dilatazioni del esofago.

DEFINITION.—*Sacculated protrusions from the œsophageal canal, or uniform expansion of its walls, giving rise to dysphagia and regurgitation of the ingesta.*

History.—Blasius[1] described, under the name of "double stomach" what, from his own report, and the rough drawing which accompanies it, was undoubtedly an instance of dilatation of the lower part of the gullet. A case of œsophageal pouch was referred to by Morgagni[2] in 1765 as having been described by Grashuis long before, and two years later Ludlow[3] reported his remarkable case. Isolated examples of the affection have, since then, been placed on record by Gianella,[4] Bell,[5] Purton,[6] Worthington,[7] Mayo,[8] and others. In 1840, Rokitansky[9] described an instance in which part of the œsophageal wall had been drawn outwards in the course of cicatrization of a diseased lymphatic gland—a class of cases to which Zenker and Ziemssen subsequently gave the name of "traction-diverticula." In

---

[1] "Obs. med. anat. rarior." pars iv. obs. ix. Lugdun. Batav. 1711, p. 53, and Tab. vi. fig. v., Ibid. p. 113.

[2] "De sed. et caus. morb." epist. xxviii. art. 18, ed. secund. Patavii, 1765, t. ii. p. 11.

[3] "Med. Observ. and Inquiries, by a Society of Physicians in London." London, 1767, vol. iii. p. 85, et seq. Ludlow's letter describing the case is dated Sept. 9, 1764.

[4] Borsieri: "Istituz. di Med. Prat." cap. xxxix. § mccxix. Firenze, 1837, t. ii. p. 998, foot-note 4. The case was observed in 1782.

[5] "Surgical Observations." London, 1817, vol. i. p. 64, et seq.

[6] "London Med. and Phys. Journ." 1821, xlvi. p. 541.

[7] "Med.-Chir. Trans." London, 1847, vol. xxx. p. 199, et seq.

[8] "Outlines of Pathology." London, 1835, p. 285.

[9] "Œsterr. Jahrb." 1840, Bd. xxi. p. 219.

1861 Rokitansky[1] described systematically the various kinds of dilatations which are found in the pharyngo-œsophageal canal. In 1867 an inaugural dissertation on the subject of œsophageal pouches was published by Fridberg.[2] In recent years, Zenker[3] has collected a large amount of pathological material bearing especially on the question of traction-diverticula, and the whole subject has been treated with remarkable completeness by Zenker and Ziemssen.[4]

[1] "Lehrbuch d. pathol. Anat," vol. iii. p. 127.
[2] "Diss. de œsophagi diverticulis." Giessen.
[3] "Cyclopædia of Pract. Med." vol. viii. p. 68.
[4] Ibid.

⁂ Dilatations differ so widely as regards their mode of origin, situation, symptoms, course and termination, that in dealing with them it will be found more convenient to depart from the regular plan adopted in this work, and to describe separately each form of the disease.

SIMPLE DILATATIONS.

These dilatations may be either primary or secondary—the former occurring without any obvious cause, and the latter being the result of a stricture of the œsophageal canal at a lower level.

PRIMARY DILATATIONS.

These are cylindrical or fusiform in shape, generally affecting the whole length and circumference of the œsophagus, and usually attaining their maximum girth in the thoracic region about the middle of the gullet. The fact of the widest expansion occurring in this situation is probably to be explained by the greater freedom of the tube at this point from immediate pressure by the neighbouring parts. In the case, however, described and figured by Blasius,[1] the dilatation was just above the diaphragm, and affected only the lower three inches of the gullet. Judging from the drawing, the dilatation must have been spheroidal in shape, measuring about four and a half inches from side to side.

This form of dilatation is rare, and the *cause of it is probably general weakness, congenital or acquired, of the œsophageal wall in its whole circumference.* In most of the recorded examples the symptoms appear to have commenced between the ages of fifteen and twenty, but it is probable that in many of these cases the predisposing local weakness had existed since birth. One example of feeble development has been observed by Zenker,[1] in which simple dilatation of the gullet occurred in a seven months' child which died on the seventh day after birth. Klebs[2] has reported a case of dilatation which he supposed to be due to atony of the walls of the tube. Spengler[3] has recorded an example in which the first symptoms came on after swallowing a very hot dumpling which was temporarily arrested in the gullet. Purton[4] has reported a case in which the affection developed after a blow on the chest, and a similar instance is related by Hannay.[5] An example of the disease is mentioned by Oppolzer,[6] in which the patient had taken large quantities of warm water to relieve gout. Although it is not at all impossible that in this case mechanical dilatation may have been effected in the manner described, it is much more likely, as Knott[7] suggests, that a gouty condition of the muscles of the œsophagus diminished their power of resistance, and thereby favoured dilatation.

---

[1] Op. cit. See also von Ammon, "Die angeborenen chirurg. Krankheiten des Menschen." Berlin, 1842, p. 37. and Taf. v. i. Fig. 15.

The most prominent *symptom* exhibited by patients labouring under this affection is the regurgitation of food some hours after it has been swallowed. The matters thus returned are alkaline or neutral in reaction, and if starchy food has been taken, they have a sweetish taste. They present no *digestive* alteration, however long they may have been retained; thus in a case reported by Delle Chiaje,[8] coffee was thrown up four or five days after it had been swallowed without having undergone any change whatever. There is generally a greatly increased secretion of saliva, which the patient has continually to spit out. In Worthington's case a pint and a half of fluid was frequently voided from the mouth in the course of twenty-four hours. There is usually also some dysphagia.

The patient's breath is in most cases fetid, owing to the decomposition of the food which remains in the gullet. Sometimes there is an agonizing feeling of distension, from which relief can only be obtained by vomiting. Occasionally there is a sensation of heat or burning throughout the gullet. When the dilatation affects the thoracic portion of the tube, the distended œsophagus may, by pressure on the heart, give rise to fainting and to symptoms similar to those of angina pectoris. In Davy's[1] case there was a pulsation resembling that of an aneurism, together with considerable pain and tenderness on pressure. There was also marked dulness on percussion. This patient was only able to swallow in a semi-recumbent position, with his right arm over the back of a chair; in any other posture deglutition was impossible, and the attempt was accompanied by a sense of suffocation which gave rise to violent attacks of coughing.

---

[1] Op. cit. p. 51.

[2] Quoted by Zenker: "Ziemssen's Cyclopædia of Pract. Med." English Transl. vol. viii. p. 47.

[3] "Wien. Med. Wochenschr." 1853, No. 25.

[4] "London Med. and Phys. Journ." 1821, xlvi.

[5] "Edin. Med. and Surg. Journ." July, 1833.

[6] "Wien. Med. Wochenschr." 1851, Nos. 2, 5, 12.

[7] Op. cit. p. 21.

[8] "Il Progresso." Napoli, 1840.

A bougie can be passed only in certain cases, the possibility of doing so probably depending on whether the œsophagus remains of normal length, or whether, becoming stretched, it is doubled upon itself.

The progress of the disease is generally slow, lasting from five to ten years or even more. Indeed, in some cases sufficient food always reaches the stomach, and there is no wasting. A very remarkable case, however, has been recorded by Dr. Ogle,[2] in which great emaciation resulted, not only from the difficulty of swallowing, but more especially from the pressure of the dilated portion of the gullet on the thoracic duct.

In the cases now under consideration, *after death* the calibre of the œsophagus is found to be greatly enlarged, the dilatation being generally somewhat spindle-shaped. In Luschka's[3] case (Fig. 15) the œsophagus was forty-six centimetres in length and thirty centimetres in circumference at the widest part. From the extreme length of the organ in this instance, it is clear that during life it must have been doubled upon itself. In these cases the muscular fibres over the affected part are greatly hypertrophied, the submucous tissue and the mucous membrane being thickened, whilst the latter is almost invariably congested, and frequently presents patches of ulceration. Occasionally, haemorrhagic spots are seen, and the papillæ are often much enlarged.

The *diagnosis* of this condition may be assisted by the exclusion of the various other causes of dysphagia, but can only be arrived at with certainty when, whilst unaltered food is regurgitated some hours after it has been swallowed, a large bougie can be easily passed down the gullet.

---

[1] "Med. Press and Circular." May 5, 1875.

[2] "Trans. Path. Soc." London, 1866, vol. xvii. p. 142.

[3] "Virchow's Archiv." 1868, Bd. xliii. p. 173, et seq.

The *prognosis* as regards cure is exceedingly unfavourable, but by selection of suitable food the patient's life may be prolonged for many years.

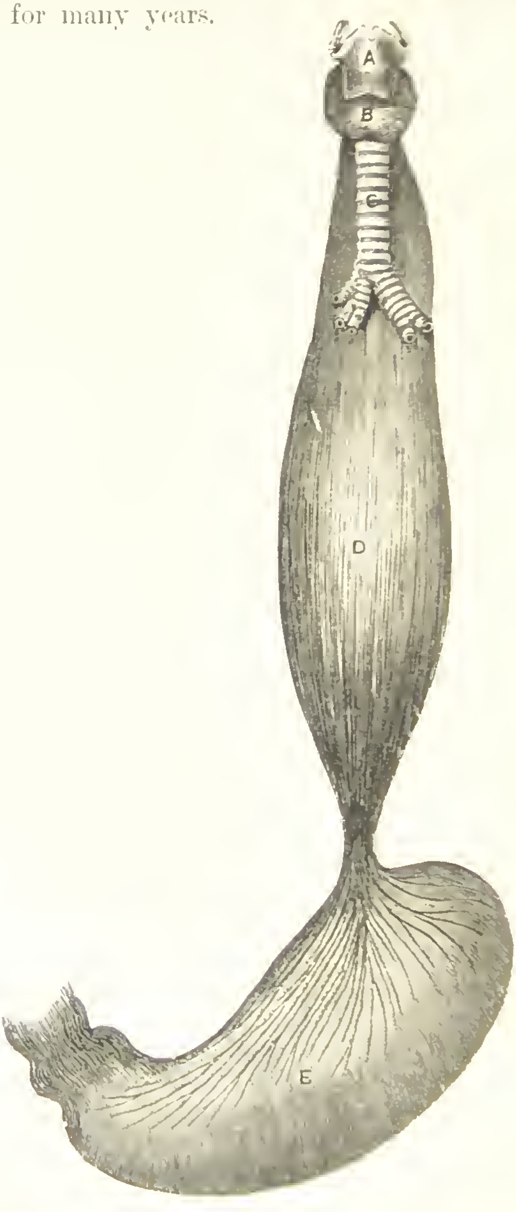

Fig. 15.—Luschka's Case of Dilated Œsophagus (after Cohen).

A, the thyroid cartilage; B, the thyroid body; C, the trachea; D, the œsophagus; E, the stomach.

The *treatment* must consist in the use of bland liquid food taken at frequent intervals and in small quantities. If alcohol be indicated by the weak condition of the patient, it should be given in a very dilute form.

SECONDARY DILATATIONS.

These are *always the result of obstruction.*

Although writers on stricture of the gullet frequently describe dilatation as existing above the narrowed part, this condition is, in fact, extremely rare. Among the very large number of cases of cancer of the gullet which I have examined, I have not met with a single example of secondary dilatation. Wilks and Moxon[1] state that they have not seen much of the condition, and suggest as reasons for the rarity of its occurrence that in such cases little or no food is taken, and that if the disease is malignant, its course is usually too rapid for a dilatation to have time to form. A few well marked instances of secondary dilatation have, however, been recorded. Monro[2] speaks of having found it in cases where the gullet had been for a long time obstructed by an impacted foreign body, or "by any other cause." Cruveilhier[3] has given a drawing of a case in which the gullet was narrowed at its lower part and dilated above. Lindau[4] has described an example which he met with in a man aged thirty, who was suddenly seized with difficulty in swallowing; after a time the food began to be regurgitated, and the patient died of exhaustion rather more than a year after the onset of the complaint. The gullet was found dilated in its whole length, but chiefly at its middle part, where it measured eleven centimetres across. Around the cardiac orifice was a rigid band, the exact structure of which is not described; this ring narrowed the opening, but had not prevented the passage into the stomach of a sponge probang during life. In the dilated portion was found one kilogramme ($2\frac{1}{5}$ lbs.) of pultaceous fluid, acid in reaction, and horribly fœtid, composed of mucus, coagulated albumen, and altered blood. The mucous membrane was almost completely stripped off. The muscular coats were greatly stretched over the expanded portion, the longitudinal and circular fibres being separated so as to give them the appearance of forming a wide-meshed network. Watson[1] refers to a preparation showing dilatation of the gullet above a cancerous stricture of the cardiac orifice of the gullet. Gradenwitz[2] has related a remarkable instance in which the œsophagus of a man who had suffered from difficulty in swallowing for forty-three years was found thickened and contracted at the lower part, and dilated above. He had been in the habit of making the food, which accumulated above the narrowed part, pass into the stomach by stretching himself, when it could be heard to go down with a loud gurgling noise. In a case of syphilitic stricture described by West[3] the constricted portion occupied two inches and a half of the œsophagus about its middle, and was so narrow as barely to allow a No. 4 catheter to go through: above this point the gullet was much dilated. In 1877 a case was reported by Nicoladoni[4] in which the patient, a girl aged four, had swallowed lye two years before she came under notice. Œsophagostomy was done with a fatal result, and after death the gullet was found narrowed for about eight centimetres at its middle. Above the point of stricture the tube was irregularly dilated for two and a half centimetres, the bulging being greatest towards the front and the left side. In 1878 Gouguenheim[5] described a case of œsophageal stricture, probably malignant in character, in which the gullet was dilated above the seat of disease, the walls of the expanded portion being greatly thinned. Soon afterwards a good example of secondary dilatation was published by Brazier.[6] The patient was a woman, aged ninety-six, who died of cancer of the stomach. The gullet was found greatly constricted for six or seven centimetres at its lower end; above this narrowed portion was a dilatation extending some way upwards, and measuring "some centimetres" across. The mucous membrane lining this pouch was sodden and pulpy, owing probably to the prolonged sojourn of food at this part. The œsophageal wall at the point of stricture was found to consist entirely of bundles of muscular fibres, so rigid as almost to suggest the idea of contraction. A case has recently been recorded by Marchand[1] in which the gullet was expanded above the situation of an epitheliomatous growth; this being the only instance among thirty autopsies collected by that writer in which such a condition was found.

---

[1] "Morbid Anatomy of the Human Gullet, &c." Edinburgh, 1811, p. 12.

[2] "Lectures on Pathological Anatomy." London, 1875, 2nd ed. p. 364.

[3] "Anatomie Pathologique." Paris, 1835-42, livraison 38, pl. 6.

[4] "Casper's Wochenschr. für die gesammte Heilkunde." 1840, p. 356.

---

[1] "Principles and Practice of Physic." London, 1857. 4th ed. vol. ii. p. 372.

[2] "Schmidt's Jahrb." 1859, vol. ci. p. 298.

[3] "Dublin Quart. Journ. of Med. Science." No. 57. Feb. 1860, p. 86, et seq.

[4] "Wien. Med. Wochenschr." 1877, No. 25.

[5] "Gazette des Hôpitaux." 1878, p. 446.

[6] "Contribution à l'Etude de l'Œsophagisme." Thèse de Paris, 1879, pp. 89, 90.

A case of a different kind has been reported by Wilks,[2] in which there was a supposed congenital stricture of the cardiac end of the gullet with great dilatation of the entire organ above the point of constriction (Fig. 16), but whether the dilatation was congenital or secondary to the stricture cannot be determined. In cases of stricture of the gullet, uncomplicated by dilatation, the food, on reaching the narrow part of the canal, is usually at once returned; but should there be a dilatation above the contracted portion of the tube, the food would probably be retained for a time and afterwards thrown up unchanged.

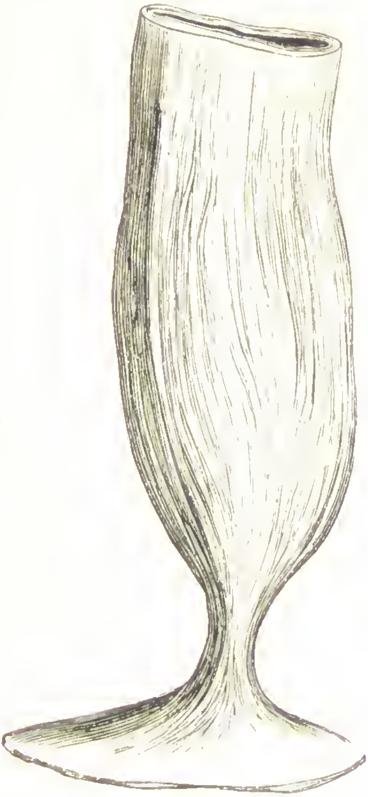

FIG. 16.

WILKS'S CASE OF SUPPOSED CONGENITAL STRICTURE AND DILATATION OF THE ŒSOPHAGUS (AFTER KNOTT).

This form of dilatation may be *distinguished* from that last described by the fact that in the case of simple pouches, as already explained, there may be a difficulty in passing a bougie at one time and not at another, whilst if a stricture be present, the obstruction is persistent; the *prognosis* depends on the original cause of the affection, and the *treatment* must be directed to the stricture. (See "Cicatricial Stricture.")

SACCIFORM DILATATIONS.

These depend on weakness of a *small portion, generally of the muscular structure, of the wall of the gullet.* They have been called "pressure-diverticula" ("Pulsions-Divertikel") by Ziemssen, owing to the fact that they are formed by *pressure* of the œsophageal wall outwards.

---

[1] "Néoplasies de l'Œsophage." Thèse de Paris, 1880, p. 50.

[2] "Guy's Hosp. Rep." 1871-2, vol. xvii.

They vary in size from a slight bulging to a sac five inches or even more in length. They are rare, and are, in the majority of instances, situated in the posterior wall of the œsophagus, at its junction with the pharynx, and pass down between the food-tract and the vertebral column. They are, in fact, pharyngeal rather than œsophageal pouches. Most writers believe that these pouches originate in congenital weakness of a limited portion of the œsophageal wall. Although the protrusion is very slight, and perhaps inappreciable in early life, it is probable that the œsophagus gives way under some trifling pressure at a later period. Hitherto, no example of this condition has been observed in a newborn infant, or even in a child, but a case has recently been published by Féré,[1] which furnishes a possible explanation of the mode of formation of some œsophageal pouches. Although in this instance the deficiency of tissue was not in the situation where a pouch is usually formed, but at a spot precisely in the middle of the anterior wall of the gullet, the case has a direct bearing on the point under consideration. The muscular coat was found to be wanting over a space one millimetre square, and about one centimetre below the upper end of the œsophagus. Even with the microscope no trace of muscular covering could be seen in this place. The borders of the space were thickened, and the interval was filled up by areolar tissue mingled with some elastic fibres. The congenital absence of the muscular covering at any point would, it need scarcely be remarked, greatly favour the development of a pouch. Billroth,[2] however, who had recorded an instance in which a pouch on the left side of the gullet was covered, not only by the mucous membrane, but by the proper muscular investment of the tube, suggests that such diverticula have their origin in a branchial fissure, the internal orifice of which remains patent, whilst the external outlet has become obliterated in the normal way. Cases are more often met with in men than in women. In twenty-nine cases collected by Zenker and Ziemssen[3] in which the sex is stated, there were but two women, and in both of them the origin of the affection was apparently traumatic. According to the same authors,[1] the disease most commonly begins after the fortieth year, and they explain the special predisposition of males, and the age at which the disease occurs, by the ossification of the cricoid cartilage, which, it is well known, is much more frequent, and comes on at an earlier age in men than in women.

---

[1] "Progrès Médical." 1879, vii. p. 227.

[2] "Clinical Surgery." Syd. Soc. Transl. London, 1881, p. 130.

[3] "Ziemssen's Cyclopædia of Pract. Med." English Transl. vol. viii. p. 64.

Zenker and Ziemssen[2] point out that the muscular investment of the pharynx is weaker near its junction with the gullet than at any other part of the pharyngo-œsophageal canal, for where the lower fibres of the inferior constrictor muscle become continuous with the upper circular fibres of the œsophagus there is a triangular space left covered only by the transverse fibres of the constrictor. Owing to the narrowness of the tube just below this, and the comparatively unyielding wall formed in front by the back of the cricoid cartilage, a hard morsel of food or a foreign body is likely to be driven against the posterior wall. A depression thus made is liable to be constantly enlarged by the pressure of descending food, and the pouch, which mainly consists of mucous membrane protruded between the muscular fibres, has no power of emptying itself by contraction on its contents. As it becomes larger it pushes the corresponding part of the œsophagus slightly forwards, and subsequently the food, in descending, tends to pass into the diverticulum, instead of going down the normal canal. Further, as the pouch becomes full, resistance to its distension in a backward direction is offered by the vertebral column, and consequently the sac presses anteriorly on the œsophagus, and sometimes closes it completely. A good illustration of this form of compression is shown in the annexed drawing of a case (Fig. 17) reported by Dr. Ogle.[3] For many years the patient had suffered from extreme dysphagia, which was supposed to be due to stricture of the tube. Cases originating in the manner above described have been published by Ludlow,[4] Dendy,[5] and Kühne.[6] Gassner[7] records an instance of the affection in which an officer received a severe injury to his neck in a fall from horse-back, which gradually resulted in the formation of an œsophageal pouch, which ultimately caused his death. In a case reported by Waldenburg[1] the patient ascribed the origin of the condition to his having been throttled, whilst in another described by Klose[2] the supposed cause was the impaction

---

[1] Op. cit. p. 65.

[2] Ibid. p. 59.

[3] "Trans. Path. Soc." London, 1866, vol. xvii. p. 141.

[4] Loc. cit.

[5] "Lancet." June, 1848.

[6] Froriep: "Chirurgische Kupfertafeln." Weimar, 1820–1847. Taf. 392.

[7] Fridberg: "Diss. de œsophagi diverticulis." Giessen, 1867.

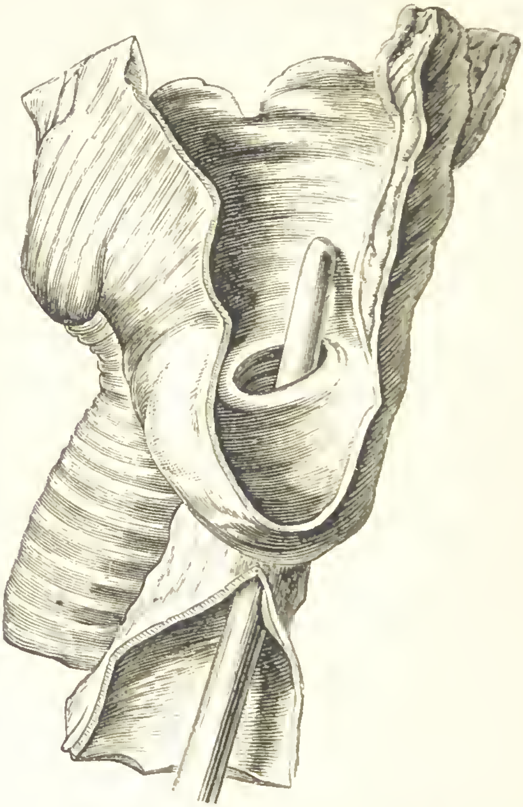

FIG. 17.—OGLE'S CASE OF SACCIFORM DILATATION OF THE ŒSOPHAGUS (AFTER KNOTT).

of a fishbone. Bücking[3] has related an example (which, however, was not verified by post-mortem examination), in which the affection was ascribed to wearing too tight a necktie. I have recently met with a case (see "Cicatricial Stricture") in which a small pouch two and a half centimetres in length and four millimetres in diameter resulted from the swallowing of a strong alkaline solution.

---

[1] "Berlin Med. Wochenschr." 1870, No. 48, p. 578.
[2] "Günsburg's Zeitschr. fur klin. Med." 1850, Bd. i. p. 344.
[3] "Baldinger's Neues Magazin für Aerzte." 1781, Bd. iii. p. 242.

The sac was situated about seven centimetres above the cardia. Half of it was really a fistulous passage between the muscular coats, but the lower portion, which projected obliquely downwards and was covered with muscle, was a true pouch. The sac communicated with the œsophagus by means of three small openings (see Fig. 20, *d*). It probably became developed in the following manner:—The caustic solution caused an ulcer in which particles of food lodged: further swallowing drove the first particles—possibly some gritty substance—more deeply into the wall of the gullet, which finally was itself pushed out.

The *symptoms* are at first so slight as not to attract much notice. They consist chiefly in the temporary retention of small fragments of food. It is only when the diverticulum enlarges and begins to press on the gullet that medical advice is sought. Owing to the situation of the pouch, when it attains any size, it is always visible in the neck at the side of the larynx. The swelling may be unilateral or bilateral. It is often impossible to pass a bougie, but it sometimes happens that it can be pushed down one day and not the next, the possibility of introducing the instrument depending on the fulness or emptiness of the sac. As a rule, when this is full, the œsophageal canal is pressed upon, and the bougie cannot be passed, but sometimes when the sac is of moderate dimensions, its temporary distension by food prevents the sound entering the abnormal cavity, and permits it to traverse the normal canal. In an instance reported by Belz[1] a loud splashing sound could be heard on pressing over the episternal notch. As the sac increases in size a considerable quantity of food lodges in it, and this is from time to time regurgitated in a manner somewhat resembling rumination. After a time the patient may gradually waste, and actually perish from inanition. In many cases, however, death has not taken place till an advanced age.

The *pathology* of these cases is very simple. The pouch, as already remarked, almost invariably forms at the junction of the pharynx with the œsophagus, and as it increases in size it usually becomes pyriform in shape. The lining membrane of the sac generally shows signs of chronic inflammation. The mucous membrane and the *submucosa* are very much thickened, the surface of the former being sometimes covered with papillary growths.

[1] "Schmidt's Jahrb." 1873. Bd. clx. p. 183.

Zenker and Ziemssen[1] maintain that *the sac has no muscular covering except at its neck*, but in Worthington's case it is stated that "nearly the upper two-thirds were covered with muscular fasciculi derived from the pharyngeal constrictors, the fibres of which were unusually developed," and in Billroth's case, as already pointed out, the sac had a complete muscular covering. The disease does not seriously shorten life, for out of nineteen cases collected by Zenker and Ziemssen,[2] in which the age is given, death took place as follows:—

	Deaths.
Between the ages of 40 and 50	2
,, ,, 50 ,, 60	3
,, ,, 60 ,, 70	8
,, ,, 70 ,, 80	5
At the age of 80	1
	19

These authors further point out that the progress of the disease is generally very slow, and that in many cases it is reported to have lasted from twenty to thirty years, and in one instance for forty-nine years.

The brief remarks made under "Simple Dilatation" as to diet and treatment apply here.

Traction-Diverticula.

The peculiarity of these diverticula is that the *cause of them is altogether external to the œsophageal wall.*

This form of dilatation is relatively common, and is generally found on the anterior wall of the œsophagus, most frequently at a point either opposite or very near to the bifurcation of the trachea. These diverticula are generally, but not invariably, conical in shape, the broad base corresponding to the œsophageal wall, and the apex directed horizontally forwards or even upwards. The disease probably begins in childhood, and it seems to affect both sexes in nearly equal proportion. Out of fifty-four cases collected by Zenker and Ziemssen,[3] twenty-nine occurred in men, and twenty-five in women. The sacs vary in size from two to eight millimetres, but occasionally they measure as much as twelve millimetres from the base to the apex; indeed, in the case reported by Fridberg,[4] the pouch was one and a half inches long.

Traction-diverticula appear to originate most commonly in scrofulous disease of the lymphatic glands, which are so abundant about the bifurcation of the windpipe. The inflammation spreads from the gland to the peri-œsophageal areolar tissue, and sometimes reaches even the muscular coat: subsequently, fibroid or calcareous degeneration of the gland takes place, followed by cicatricial contraction, and it is by the latter process that the wall of the gullet is drawn out and a sac formed. In some instances the suppuration of a scrofulous gland appears to have produced direct ulceration of the œsophageal wall, and in such cases the altered gland-structure forms the outer covering of the diverticulum. It is probable that these are the cases in which the conical form is not preserved. Vertebral caries has sometimes led to the formation of pouches.[1] The disease occasionally seems to originate in the trachea from the inhalation of gritty particles, which by setting up disease in the respiratory passages may ultimately lead to peri-œsophageal contraction.

---

[1] Op. cit. p. 57.
[2] Op. cit. p. 64.
[3] Ibid.
[4] Op. cit.

As far as I am aware, this form of diverticulum never gives rise to any symptoms during life. It is just possible that in some cases the orifice of the sac might be seen on the anterior wall with the œsophagoscope. The opening is generally exceedingly black, and the mucous membrane around it puckered, and if it came within the range of the mirror it could not be mistaken.

The form and size of traction-diverticula have already been described, and it now only remains to be observed, that in those cases in which the fundus of the diverticulum has ulcerated, disease of adjacent organs is often noticed after death. In such instances a dark-coloured fluid and occasionally portions of food are found within the sac; and Rokitansky[2] has reported a case in which a small flat piece of bone was met with, which was supposed to have given rise to a perforation at the distal end of the diverticulum. In such cases a fistulous tract may even extend to the pericardium, the pleural cavity, or the apex of one of the lungs, where it is sometimes in communication with a previously existing vomica. The most frequent course of the fistula, however, is into one of the bronchi. The passage of small particles of food or portions of ichorous matter into the bronchial tubes may give rise to bronchitis, pneumonia, or even gangrene. The fistula may cause instant death by perforation of the aorta, as in a case observed by G. Merkel,[1] but this is a very rare phenomenon.

---

[1] Zenker and Ziemssen: Op. cit. p. 75, foot-note 1.

[2] "Lehrb. d. pathol. Anat." Wien, 1861, p. 38.

As the disease has not hitherto been recognized during life, the question of prognosis does not come within the domain of practical medicine. No treatment is likely to be of any avail, and should the complaint be suspected, all that the physician can do is to recommend a soft and non-irritating diet.

The following is a good illustration of traction-diverticulum which recently came under my notice :—

In the gullet of a man, aged fifty-three, a pouch was found, of which the annexed woodcuts give a good representation (Figs. 18 and 19). It was situated at the junction of the anterior and left walls, the opening being vertical in direction, and irregular from puckering of the mucous membrane. The aperture was from four to five millimetres wide and nineteen in length, its upper end being rather more

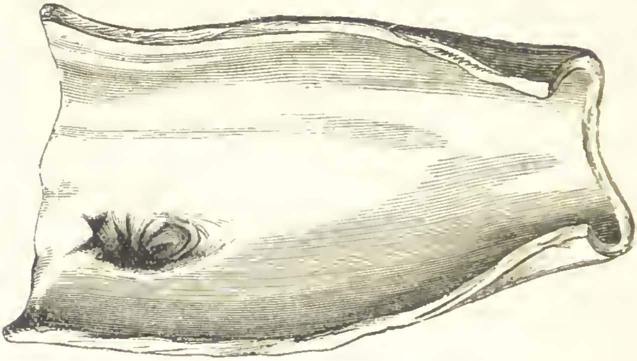

FIG. 18. The gullet laid open, showing the pouch as seen from the inside.

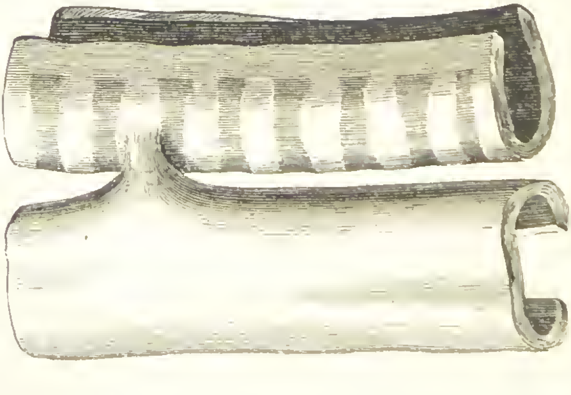

FIG. 19. Portions of the œsophagus and trachea about three and a half inches below the level of the cricoid cartilage, showing adhesion between the wall of the gullet and the windpipe at one point.

---

[1] "Ziemssen's Cyclopaedia," vol. viii. p. 81.

than nine centimetres below the lower rim of the cricoid cartilage. The diverticulum was large enough to admit the tip of the little finger, and extended inwards for eleven millimetres at the deepest part. The lining membrane was perfectly healthy but much puckered. The direction of the pouch was horizontally forwards to the trachea, into which the fibres were inserted by a quasi-aponeurotic band of thickened areolar tissue. The attachment was about a quarter of an inch in breadth, and joined the posterior wall of the trachea to the left of the middle line—that is to say, altogether on the cartilaginous part of the air-tube ; the insertion of the pouch was more or less vertical in direction, corresponding to the intra-œsophageal opening, but with a distinct inclination downwards and inwards. External to the pouch were some enlarged glands, and it was surrounded, especially near the tracheal extremity, by a good deal of thickened tissue. No symptoms traceable to this condition had been noticed during life. The patient died from cancer of the gullet, but the malignant disease was at the upper part of the tube, and did not approach nearer than from two to three centimetres to the pouch. No connection could be discovered between the two affections, and, as far as could be judged from the appearance of the surrounding tissues, the diverticulum was long antecedent to the carcinomatous growth.

CICATRICIAL STRICTURE OF THE GULLET.

Latin Eq.—Coarctatio œsophagi a cicatrice.
French Eq.—Rétrécissement cicatriciel de l'œsophage.
German Eq.—Narbige Strictur der Speiseröhre.
Italian Eq.—Strettura cicatriciale del esofago.

Definition.—*Diminution of the lumen of the œsophagus caused by contraction of the cicatrix of a previously existing ulcer or wound, giving rise to severe dysphagia, and often to death by starvation.*

History.—The ancient physicians had probably no acquaintance with traumatic stricture of the gullet, for in those days the strong acids and the weak alkaline solutions, now so largely used in the arts and for household purposes, were confined to the alchemist's laboratory. Œsophageal stricture, however, arising from the healing of syphilitic or variolous ulcers[1] did not escape the notice of the earlier writers. (See "Syphilis of the Gullet.") Cicatricial contraction was distinctly recognized by Beutel[2] as a possible cause of

[1] Two cases have been related (Brechfeld : "Ephem. Natur. Curios." 1671, p. 182. Lanzoni : Ibid. Ann. ii. Obs. ix. t. xlv. p. 80) in which obstruction appears to have been due to the agglutination of the opposite sides of the gullet from ulceration consequent on variolous pustules. The affection, however, is so extremely rare, that it has not been thought necessary to treat of it in a separate article.

[2] "De strumâ œsophagi." Tübingen, 1742.

narrowing of the œsophageal canal, and it was also mentioned by Morgagni.[1] At a later period cases of injury to the œsophagus from corrosive solutions, followed by stricture of its channel, were related by Charles Bell,[2] Cumin,[3] Dewar,[4] Syme,[5] Gendron,[6] Bayle and Cayol,[7] Wolff,[8] and Béhier.[9] In 1862 Keller[10] reported a number of cases occurring in young children, whilst quite recently Wolzendorf[11] has published ninety-one examples of the affection collected from various sources.

[1] "De sed. et causis morb." ed. secunda. Patavii, 1765, ep. xxviii.
[2] "Surgical Observations." 1817, vol. i. p. 80.
[3] "Trans. Edin. Med.-Chir. Soc." 1827, vol. iii. p. 600, &c.
[4] "Edin. Med. and Surg. Journ." vol. xxx. p. 310, &c.
[5] "Edin. Med. and Surg. Journ." October, 1836.
[6] "Journ. des Connaissances Méd.-Chir." 1837.
[7] "Dict. en 60 volumes," t. iii. p. 615.
[8] "Archiv. Gén." 1853, t. ii. p. 490.
[9] "Conférences de Clinique Médicale." Paris, 1864, pp. 113-117.
[10] "Œsterr. Zeitung für prakt. Heilk." 1862, Nos. 45-47. Keller's cases have already been referred to under "Traumatic Œsophagitis."
[11] "Deutsche Militärärztl. Zeitschr." 1880, p. 477.

Etiology.—Cicatricial stricture of the gullet may result from any disease or injury in which ulceration is followed by healing. The most common cause of these contractions is probably to be found in the swallowing of weak alkaline solutions, especially soap-lees, but occasionally they are due to the action of concentrated poisons (see "Traumatic Œsophagitis"). Most of the patients in this country are adults, but abroad the accident appears to be not unfrequent among children and even infants, Keller having reported no fewer than forty-five cases met with in children between twelve and fifteen months old. Contraction also sometimes arises from the temporary impaction of a foreign body producing an ulcer, which ultimately cicatrizes. Leroux[1] mentions a case in which the narrowing followed the swallowing of very hot liquid containing a piece of leek. A most interesting case has lately been related by Dr. Kendal Franks,[2] in which gradually increasing dysphagia had followed the impaction of a hard piece of bread-crust. When the patient, a girl, aged twenty, was first seen by Dr. Franks, the affection had existed for four years and a half, and she was much emaciated. There was no evidence of hysteria, and I think there can be no doubt that the stricture was due to cicatricial thickening at the place where the gullet had been injured by the rugged edge of the crust at the time of the accident.

Symptoms.—The characteristic symptom of cicatricial stricture of the œsophagus is dysphagia, which in general terms may be said to vary in degree according to the amount of narrowing of the canal. Sometimes, however, though the actual organic obstruction may be slight, deglutition is rendered difficult by superinduced spasm. Where the contraction results from the swallowing of *a weak caustic or irritant solution*, there is generally, at the commencement, an inflammatory period, during which there is great dysphagia and often odynphagia ; these symptoms persist as long as the ulceration continues, but when the ulcer heals, the patient can usually swallow with ease, and for some time may consider himself cured. At the end of a few months, however, owing to the contraction of the tissue forming the cicatrix, difficulty in swallowing is again experienced. From this period the dysphagia generally grows steadily worse, and if not relieved is extremely likely to prove fatal. In cases where the poison has been *a strong caustic*, the dysphagia does not pass off at all, or only subsides for a few days, and soon again becomes urgent. Thus in a case reported by Fugier,[1] after the expulsion of a large mass of membrane, liquids passed easily, but this improvement only lasted for twelve days, when it became impossible for the patient to swallow nourishment of any kind. The course of cicatricial stricture resulting from disease is very similar to that arising from accidental injury, for the dysphagia from which the patient suffers whilst the ulcer is open, passes off as the surface heals, and again causes trouble after cicatrization.

---

[1] "Cours sur les Généralités de la Médecine pratique." Paris, 1825, t. i. p. 315.
[2] "Med. Press and Circular." April 19, 1882, p. 335.

The *position* of the stricture may be ascertained by auscultation, or by the passage of a bougie. On listening over the course of the œsophagus posteriorly it will be noticed that fluids pass at the ordinary rate and give rise to the normal sound till they reach the upper part of the stricture, when the fluid is partially arrested, and a gurgling or trickling noise is perceived below the point of obstruction. The latter phenomenon may be observed to continue for three, four, or even five minutes after a mouthful of fluid has been swallowed. On using the bougie, the instrument is either arrested at the point of obstruction, or is passed beyond it with difficulty. Sometimes a second stricture may be found[2] lower down, whilst occasionally even three strictures are present.[3]

---

[1] "Des Rétrécissements de l'Œsophage." Thèse de Paris, 1877 p. 20.

[2] "Bull. de la Soc. Anat." 1841, p. 170.

[3] Basham : "Med.-Chir. Trans." vols. xxxiii. and xlv.

Diagnosis.—As a rule, in the traumatic cases, the diagnosis presents no difficulty, the history of an irritant poison having been swallowed at once removing all doubt. It is only in very rare instances—where, for example, the temporary lodgment of a foreign body, or the fact of an irritant having been swallowed in early life has been forgotten, or where a caustic poison having been taken suicidally the patient is unwilling to confess the circumstance, or where an insane person is the subject of the stricture—that any question can arise. Under such exceptional circumstances it will be necessary—first, to determine whether the difficulty of swallowing be due to *stricture* or to *compression* of the œsophagus; and, secondly, in the event of the affection being intra-œsophageal, to eliminate the various other diseases of the gullet. In cases of compression, the difficulty of swallowing, though considerable, is seldom so marked as in cicatricial stricture, except in certain rare instances of fibrous or cancerous enlargement of the thyroid gland, or of tumour in the posterior mediastinum. In aneurism of the arch of the aorta, and enlargement of the cervical or bronchial glands, as well as in peri-œsophageal abscess, the difficulty in swallowing is seldom so extreme or so constant. The morbid conditions, moreover, which cause dysphagia by compression are in most cases sufficiently obvious to be at once recognized. They will be again referred to in the article on "Compression of the Gullet."

The only diseases of the œsophagus itself which require to be differentiated from cicatricial contraction are cancer and simple stenosis. Malignant disease may be recognized by its usual occurrence in persons over forty years of age, and by its progressive character, the dysphagia generally attaining its full intensity in the course of a few months. The special, though not invariable, characteristic of true cicatricial stricture, on the other hand, is the peculiar character of the dysphagia—that is to say, its primary occurrence, its disappearance, and its subsequent return in a more severe and intractable form. In cases of simple stenosis there is a history of difficulty in swallowing from an early period of life, and the symptom is not progressive. Where cicatricial stricture results from the healing of an ulcer caused by disease, a clear history of the previous existence of the constitutional complaint can alone establish the diagnosis.

Pathology.—The stricture in traumatic cases nearly always occupies two or three inches of the gullet, and may occasionally involve its entire length. In a case reported by Czerny,[1] cicatricial tissue replaced the normal structures throughout the lower third of the tube. In one of my cases (Sarah C.), hereafter reported, the stricture extended from within half an inch of the cricoid cartilage to within an inch of the cardia. In nearly every instance the walls of the œsophagus are considerably thickened. The lumen of the canal is generally very much narrowed, and sometimes, as in a case related by Horsey,[2] absolutely obliterated, the gullet being represented by a dense fibrous cord. The lining membrane presents considerable variety of appearance, for sometimes long vertical folds are met with, which during life, no doubt, meet in the centre of the canal, or even interlock in such a way as completely to occlude the passage. Sometimes there are transverse bands, and not unfrequently a rough reticular structure is found formed by short fibrous ridges running in every direction, whilst occasionally a quasi-cribriform appearance is produced by the presence of a great number of small, deep excavations. In nearly all cases there are some smooth indurated patches where the mucous membrane has been replaced by cicatricial tissue. Although dilatation of the œsophagus above the seat of stricture is not generally observed in cases of cicatricial contraction, still it has been occasionally met with.[3]

Prognosis.—The prospects of the patient depend a good deal on the strength of the irritant solution which has been swallowed. For this reason, in suicidal cases where strong mineral acids are usually taken, extensive and intractable cicatrices are much more likely to be present than where patients have accidentally swallowed solutions of soap-lees. It may, however, be laid down as a general rule that cicatricial stricture is always attended with considerable danger, for not only is it often exceedingly difficult to effect dilatation, but even in cases where some degree of expansion has been produced, subsequent contraction is likely to take place unless the use of bougies is regularly persevered with. Many instances of cure, however, have been reported. The most successful series is that of Keller's[4] thirty-five cases, of which twenty-three were cured, three benefited, five died (one of them from gangrene of the lungs), and four remained under treatment at the time of the report.[1] When it is remembered that in all these instances the patients were infants under two years of age, the success of the treatment is all the more remarkable, and must indeed be regarded as quite exceptional. It is probable that in many of these cases the obstruction was due rather to inflammatory thickening and induration than to actual cicatrization. Out of seventy-five cases of which details are given by Wolzendorf,[2] twenty-three proved fatal.

---

[1] "Beiträge zur Operativen Chirurgie." 1878, p. 70.
[2] "Amer. Journ. Med. Sci." 1876, New Series, lxxii. p. 111
[3] See "Dilatations of the Gullet."
[4] Loc. cit.

Treatment.—Medical treatment is of little use, but, as is shown by the above figures, surgery claims many cures. More often, however, all that can be done is to prolong life. The following are the various methods of combating the local condition:—1, gentle dilatation; 2, forcible dilatation; 3, internal œsophagotomy; 4, œsophagostomy; and 5, gastrostomy.

Gentle dilatation is the method by which the largest number of cases have been cured, but it is obvious that its success is likely to be greatest where the disease is slight and recent, and more especially in those cases which, though originating in the same way as true cicatricial stricture, and scarcely to be distinguished therefrom in their clinical history, strictly belong to the class of indurations. Dilatation is best effected by passing bougies of gradually increasing diameter. The mode of using these instruments has already been described (pp. 11 and 12). Where there is obvious difficulty in swallowing, a No. 6 (Author's scale) should first be tried, and if this will not pass, a smaller instrument must be employed. As the passage of the bougie often provokes coughing and a considerable flow of saliva and mucus, the patient should be made to bend forwards in order that the secretion may fall easily into a hand-basin. The bougie should, if possible, be left in position on the first occasion for five minutes, and as the patient gets accustomed to its use, he may be able to tolerate it for ten or twenty minutes or even for half an hour at a time. The operation may be repeated twice a week, and in some cases on alternate days. Very few patients can bear the daily passage of the instrument. The same size of bougie should be passed on at least two occasions, and generally it is better to use it three or four times before a larger one is employed. Some surgeons, after withdrawing a bougie, immediately try to pass a larger one, under the impression that an instrument of greater size can by this means be more easily made to traverse the stricture. I have not found this to be the case, but on the contrary it has appeared to me that the passage of one bougie generally gives rise to a slight amount of congestion, which renders it difficult to introduce a second one at the same sitting. In adults it is unnecessary to dilate the œsophagus beyond the size of No. 15 (Author's scale), whilst for children under twelve, bougies larger than No. 8 should not be used, and for those between twelve and sixteen years of age, the maximum size should be No. 12.

---

[1] Keller reports forty-six cases of traumatic œsophagitis caused by swallowing soap-lees, but eight of these were slight cases, in which no stricture resulted, and three died soon after the accident.

[2] Loc. cit.

I formerly attempted to dilate cicatricial strictures by means of oversliding catheters—that is to say, by first passing a whalebone bougie, and then running over it a catheter finely tipped with metal; but though I tried a great variety of instruments, I found that owing to the relaxed condition of the walls of the œsophagus, the catheter was so often caught in the folds of the mucous membrane, that I was obliged to give up this method.

Forcible Dilatation.—My experience of forcible dilatation has not been satisfactory. In 1862 and the following year I had several instruments made,[1] and I had an opportunity of using them in four cases of cicatricial stricture, but though I did not meet with any accident, I found it extremely difficult to apply the dilating force at exactly the right spot, and also to regulate the degree of expansion. Some of these cases which appeared to be cured[2] at the time relapsed after a few months, and I ultimately abandoned the method altogether. Quite recently, however, Dr. Kendal Franks[3] has been more fortunate, and in the case already alluded to under "Etiology," he succeeded in effecting the cure of a fibrous stricture by rapid stretching with Otis's dilating urethrotome followed by the regular passage of bougies.

Of the remaining operations, internal œsophagotomy, œsophagostomy, and gastrostomy, the two latter have been performed much more frequently for cancerous than for cicatricial stricture, not because the results in the former condition promised to be more favourable, but because cancer of the gullet gives rise to obstruction much more often than any other affection. It has therefore been thought desirable to consider these two operations irrespectively of the special lesion for which they have been undertaken.

---

[1] By Krohne and Sesemann.

[2] See a report of one of these cases in the "Transactions of the Clinical Society," 1870, vol. iii. pp. 181, 182, where also a description of the instrument which I used may be found.

[3] Loc. cit. p. 335.

Internal Œsophagotomy.—Strictures may sometimes be cut through by means of an instrument introduced through the narrowed portion of the gullet.

History of the Operation.—To Maisonneuve[1] belongs the credit of first attempting to relieve cicatricial stricture of the gullet by internal incision. He operated on three cases, of which two died and one recovered. In the two fatal cases the patients were women, and succumbed to peritonitis, which Maisonneuve believed to have been set up by the operation in consequence of a special sympathy which he assumed to exist between the gullet and the peritoneum. In a fourth case in which the same surgeon attempted internal œsophagotomy the patient's death was due to a false passage which was made into the posterior mediastinum. Lanelongue[2] soon afterwards operated successfully. Dolbeau[3] performed the operation on two patients, both of whom appeared to be cured as long as they continued under observation. Trélat[4] had a good result from the procedure in spite of severe primary and secondary hæmorrhage. Tillaux,[5] Studsgaard,[6] and Schilz,[7] have each reported a successful case. The last-named surgeon was less fortunate in a second instance, in which the patient died from profuse hæmorrhage.[8] Czerny[9] performed the operation on a child who died from peri-œsophageal cellulitis complicated by diphtheria. Recently cases have been treated after this method by myself and by Dr. Roe,[10] of Rochester, U.S., the particulars of which will be found below. Dr. Elsberg,[11] of New York, has also operated successfully in two cases.

[1] "Clinique Chirurgicale." Paris, 1864, t. ii. p. 409.
[2] "Mém. de la Soc. de Chir. de Paris." 1865, t. vi. p. 547.
[3] "Gazette des Hôpitaux." 1870.
[4] "Bull. Gén. de Thérap." 1870, t. lxxviii. p. 252.
[5] "Bull. de Thérap." 1872, t. lxxxiv. p. 14.
[6] "Canstatt's Jahresb." 1873, Bd. ii. p. 487; and 1875. Bd. ii. Abtheil. ii. p. 297.
[7] "Correspondenz-Blatt. d. ärztl. Vereins in Rheinland." April. 1877, No. 19. p. 19.
[8] Ibid.
[9] "Beiträge zur Operat. Chirurg." 1878, p. 70.
[10] "New York Med. Record." Nov. 11, 1882.
[11] "Arch. of Laryngol.' Jan. 1883, vol. iv. No. 1, p. 56, et seq.

The stricture has sometimes been divided from above downwards,[1] but this method is extremely dangerous, and should never be attempted. The incisions should always be made from below upwards. The use of the œsophagotome (Fig. 9, p. 21) is perfectly simple. It is introduced with the blade concealed, and when the portion of the instrument containing the knife is felt to be below the stricture, the blade is to be made to project, and by a rapid upward movement of the instrument the obstructing band should be cut through. If necessary two or three incisions may be made. A week after the operation a medium-sized bougie should be passed to counteract the tendency of the divided tissues to shrink in healing, and instruments of gradually increasing size should be used from time to time.

---

[1] By Maisonneuve, Lanelongue and Studsgaard.

From an examination of the results of the published cases (see "History") internal œsophagotomy does not appear to be a very satisfactory operation. Of the seventeen cases in which it has been practised, four died, *i.e.*, 23·5 per cent. This estimate includes only cases which proved fatal within fifteen days of the operation; the mortality would doubtless appear much higher if all the cases were counted in which death, though directly traceable to the operation, did not occur within the above-mentioned period. Thus, in my own case the patient died three months after the œsophageal stricture was divided, but the pulmonary inflammation, to which he ultimately succumbed, came on so soon after the operation that it is most probable there was a causal relation between the two events.

On analysing the statistics more closely it will be found that the operation has been done eleven times for the relief of cicatricial stricture, twice for œsophageal stenosis of an indefinite nature, once for malignant, and once for tubercular disease. Of the remaining two cases I have no details beyond the fact recorded by the operator that they were successful. Of the cicatricial cases three, *i.e.*, 27·28 per cent., died. This average, however, would be considerably reduced if each individual act of œsophagotomy were to be counted as a separate case, for the operation was performed six times on one of the patients, three times on another, and twice on a third. This would raise the total number of operations to nineteen, with a mortality of only 15·7 per cent. In the case of malignant disease intra-œsophageal section was practised five times, on each occasion with definite, though transient, benefit, and the patient finally died of phthisis. The patient with tubercular stricture died of peritonitis four days after the operation.

The *advantages* of internal œsophagotomy are:—

1st. That it is attended with an inconsiderable amount of shock.

2ndly. That if the stricture can be thoroughly divided, gradual dilatation can be carried out and a cure thereby be effected.

3rdly. That the procedure involves no external wound requiring constant attention and giving rise to disfigurement.

The *disadvantages* of internal œsophagotomy are:—

1st. That it can only be safely performed in cases where it is still possible to get a bougie through the stricture.

2ndly. That owing to the formation of these strictures, which often extend far down the gullet, it is difficult to get beyond all the points of obstruction. (It may be added that in many cases of cicatricial narrowing the obstructing ridges are vertical in direction, and therefore cannot be divided by any instrument [see Fig. 20, *a*].)

3rdly. That in many cases the walls of the œsophagus are so much thickened that limited longitudinal incision cannot relieve the obstruction.

4thly. That the actual danger attending the performance of the operation is far from inconsiderable. (Indeed, the thinness of the œsophageal walls, the close proximity of many vital organs, and the fact that in disease the gullet is often intimately adherent to the surrounding parts, constitute dangers which cannot be ignored. In one of the fatal cases death was due to hæmorrhage, and in one of the successful operations bleeding occurred to an alarming extent.)

The following case illustrates cicatricial stricture:—

Henry A. drank a solution of potash on September 17, 1880, and in spite of immediate treatment at the London Hospital, his gullet became so much narrowed that thirteen weeks elapsed before he was able to swallow fish. The stricture was treated by gradual dilatation until February, 1881, when, owing to an attack of small-pox, the patient discontinued his attendance for four weeks. When seen again he could swallow nothing but jelly. He was admitted into the Hospital for Diseases of the Throat, under my care, on April 7, 1881, being by that time in an extremely weak condition. The stricture was found to begin just below the level of the cricoid cartilage, the canal of the œsophagus at the affected part being very tortuous and deviating to the left side. Gradual dilatation rendered it possible to pass a No. 8 bougie by June 2: but more than a month later an advance of only one size had been made. On July 12 I performed internal œsophagotomy, dividing the stricture in the middle line behind from below upwards. A No. 14 bougie could then be passed without difficulty. The pain of the operation was slight, but in a few hours the patient began to feel some discomfort over the base of the right lung, and unmistakable signs of pneumonia soon afterwards showed themselves. Dilatation with bougies was resumed after a few days, and in August No. 15 could be passed easily. The patient was shown to the members of the International Congress on August 4, and at that time, whilst still suffering from some pulmonary trouble, his general condition was fairly satisfactory. He passed from my care a day or two afterwards, as the Throat Hospital had to be closed for the purpose of being rebuilt. He soon afterwards re-entered the London Hospital, and died in that institution about the middle of October, 1881. At the autopsy both lungs showed patches of pneumonia, and there was some purulent effusion in the right pleura. The gullet was found thickened to such an extent as to narrow considerably the calibre of the tube for three inches downwards from the level of the cricoid cartilage. The strictured portion was found to have been divided posteriorly for about an inch at the lower part.

Dr. Roe, of Rochester, U.S., has lately reported two cases[1] in which he has successfully used my œsophagotome. One was that of a lady, aged twenty-four, on whom he twice operated for stricture of the gullet, making on the first occasion one posterior incision, and on the second two lateral cuts, after which dilatation with bougies could be satisfactorily carried out.

The patient in the other case was a boy, aged eight years, whose œsophagus was narrowed at its lower part through the action of a caustic fluid, to such a degree that even milk could scarcely be swallowed. Dr. Roe divided the stricture in six different places at intervals of a few days, and then practised dilatation with success.

Œsophagostomy.—The gullet may sometimes be opened either at the seat of stricture, or below it. This is an operation which, in a few cases, has proved highly successful.

History of the Operation.—The establishment of a fistulous opening in the neck for the relief of stricture of the œsophagus appears to have been first suggested by Stoffel.[2] The first recorded instance, however, in which the operation was performed is one briefly alluded to by Tarenget[3] in 1786. The operator's name has not been preserved, but the case was more successful than any of those which have been done since. The patient was a woman suffering from what would seem to have been cancer of the gullet, and in spite of the fact that the cervical and submaxillary glands were already enlarged at the time of the operation, she is stated to have survived for a period of sixteen months, during which she was fed entirely through the fistula. More than half a century later, Watson[4] published a case of what he calls tubercular stricture, in which he opened the gullet. The disease, however, was possibly malignant, as there were no signs of tubercle in the lungs. The patient—a young man, aged twenty-four—lived two months after the operation, and died of œdema of the glottis, and for which tracheotomy had to be done. The thyroid body was greatly enlarged, but does not appear to have pressed upon the gullet. Soon afterwards Lavacherie[5] operated on a man, aged sixty-eight, suffering from what was probably a cancerous stricture of the œsophagus.

---

[1] "New York Med. Record." Nov. 11, 1882, pp. 536, 538.

[2] Quoted by Bonet: "Sepulchretum," Lugduni, 1700, lib. iii. sect. iv. Obs. xx p. 35.

[3] "Journ. de Méd., Chir. et Phar." 1786, t. lxviii. p. 250.

[4] "Dublin Journ. of the Med. Sciences." 1845, vol. xxvii. p. 260.

[5] "Bull. de l'Acad. de Méd. Royale de Belgique." 1845, t. iv. p. 758.

This case is of somewhat doubtful character, as the cutting operation appears to have been undertaken mainly, if not solely, for the extraction of an ivory tube which had been passed into the stricture and could not be withdrawn. The gullet was opened, and the patient was fed through a tube, but it is not clear whether this was introduced through the wound or through the mouth. Death took place on the fifteenth day. Œsophagostomy was successfully performed by Monod[1] on a woman suffering from cancerous stricture of the upper part of the food-channel. She survived the operation three months, and died from the inevitable progress of the disease. In 1853 Follin[2] published a monograph on stricture of the gullet, wherein he advocated œsophagostomy in suitable cases. Richet[3] states that he performed the operation for impermeable narrowing of the gullet opposite the second dorsal vertebra; the canal was opened, and a sound passed through the stricture and left *in situ*. Unfortunately, no further details are given, either as to the result of the case or the nature of the disease. In 1859 Bruns[4] reported the case of a man, aged thirty-eight, suffering from dysphagia, on whom he operated. The patient lived ten days, and, after death, the cause of the complaint was found to be compression of the œsophagus by an enlarged thyroid. A somewhat similar case was related by the same surgeon[5] a few years later. The patient was a man, aged thirty-seven, who had been afflicted with difficulty of swallowing for a year; œsophagostomy was done, and the man died in five weeks. In this case, as in Watson's above related, death was due to pulmonary disease and to œdema of the larynx, which made tracheotomy necessary. The thyroid was found to be somewhat enlarged, and a vast abscess with gangrenous walls was seen encircling the upper part of the gullet. Three years afterwards, Willett[6] performed the operation on a woman, aged forty-seven, suffering from œsophageal carcinoma; the patient had begun to regain her strength when she refused to be fed, and died of exhaustion eighteen days after the establishment of the fistula. In 1868 Cheever,[7] in an interesting report of two cases of external œsophagotomy for foreign bodies, took occasion to make some remarks on the same proceeding when practised for stricture of the gullet, and two years later the whole subject was fully discussed by Terrier[8] in an elaborate and valuable monograph. In 1870 the operation was performed by Menzel[9] on a man, aged forty-four, a patient of Billroth's, who was suffering from cancerous stricture; death took place on the following day. Three years subsequently, Podrazki[10] performed œsophagostomy on a man, aged forty, who had suffered from well-marked syphilis; the patient died two days afterwards, and his disease, which, during life, had been supposed to be of venereal origin, was found to be purely carcinomatous. In 1875 Poinsot[11] operated on a woman, aged fifty-five, whose œsophagus was obstructed by malignant growths; the patient expired twenty hours after the operation. In 1876[1] I recorded a case in which œsophagostomy had been performed by Evans, nine years previously, on a woman, aged forty-three. The disease was malignant, and the patient died of collapse fifty hours after the operation. In the same year a case was related by Horsey,[2] in which he operated on a boy, aged five, who had swallowed some caustic fluid; the gullet was unintentionally opened above the stricture, which was found to be quite impervious. The wound was therefore closed, and the little patient died of shock within twenty-two hours. In 1877 Kappeler[3] related two cases of œsophageal cancer, in which he made an opening into the gullet through the neck. In each instance the operation had been undertaken with a view to actual removal of the disease by excision, and it was only when this was found impracticable, owing to the extent and situation of the morbid mass, that, as a desperate measure, œsophagostomy was tried. The first patient, a man, aged forty-two, died five days after the operation; whilst the other, a man of sixty-five, survived only forty-four hours. In the same year, Bryk[4] published a case in which he had performed œsophagostomy for the relief of cicatricial stricture; the patient was alive seven weeks after the operation, but the ultimate result is not stated. Nicoladoni[5] also recorded a case in which he had recourse to œsophagostomy. The patient was a girl, aged four, who was suffering from cicatricial stricture of two years' standing; the gullet was incised above the point of narrowing, when it was found that the tube was expanded into a pouch at its upper part. The little patient died in six days. An instance is related by Zenker,[6] where the operation was done on a boy, aged three years and a half, for cicatricial stricture. Death occurred within twenty-four hours. Simon is referred to by König[7] as having opened the œsophagus in a case of cancer, but no detail is given beyond the fact that the patient survived only thirty-four hours. Hadlich[8] operated in 1880 on a man, aged sixty, who was unable to swallow from some cause, the nature of which was not clearly made out. The patient died thirteen months after the operation, but no autopsy was permitted. In the same year Studsgaard[9] performed œsophagostomy on a woman, fifty-two years of age, suffering from cancerous stricture; she improved considerably after the operation, and died five months later from the natural progress of the disease. The same surgeon[10] operated quite recently on a girl, aged nine, who had swallowed nitric acid. Death took place eight days afterwards, owing to "hæmorrhage from the internal jugular vein caused by septic ulceration." In 1880 œsophagostomy was also performed by Holmer,[11] of Copenhagen, on a man, aged fifty-seven, for cancer of the right tonsil and pharynx; the patient lived two months. In 1881 Annandale[12] related three cases in which he had performed the operation for cancerous stricture. In the first the patient, a woman aged forty-two, survived three months, and finally died of septicæmia; in another the patient, also a woman, aged fifty-three, died in ten days. Unfortunately, no details are given of the third case, which is the more to be regretted as it was one of exceptional interest, a second stricture having been encountered when the gullet had been opened below the first, and gastrostomy having, therefore, been found necessary. The operation has lately been practised by Timothy Holmes.[1] The patient was a man, about fifty years of age, who suffered from malignant stricture of the œsophagus; he died about three days after the operation. Reeves[2] has also recently performed œsophagostomy on a man, aged sixty-three, who died on the eighth day. To these cases should be added one in which Butlin[3] states that he witnessed an attempt at œsophagostomy which had to be abandoned owing to the wide extent of the disease, and another reported by Maydl,[4] in which it was found impossible to open the gullet in a case of cicatricial contraction, because of the extreme hardness of the walls.[5]

---

[1] Quoted by Follin: "Rétrécissements de l'Œsophage." Paris, 1853, p. 116.
[2] Ibid.
[3] "Traité Prat. d'Anat., Méd. Chir." 1860, 2e éd. p. 508.
[4] "Deutsche Klinik." 1859.
[5] Ibid. 1865, p. 37.
[6] "St. Barth. Hosp. Rep." 1863, vol. iv. p. 204.
[7] "Two Cases of Œsophagotomy." Boston, 1868, p. 61.
[8] "De l'Œsophagotomie Externe." Thèse de Paris, 1870.
[9] "Wien. Med. Wochenschr." 1870, No. 56, p. 1350, et seq.
[10] Ibid. 1873, Nos. 33, 35, 36.
[11] Reported by Bidan: "De l'Œsophagotomie." Bordeaux, 1881, p. 19.

---

[1] "Med. Times and Gaz." 1876, vol. ii. p. 137.

[2] "Amer. Journ. of Med. Sci." New Series, 1876, vol. lxxii. p. 114.

[3] "Deutsche Zeitschr. f. Chir." 1877, vol. vii. p. 381, et seq.

[4] "Wien. Med. Wochenschr." 1877, Nos. 41 and 45.

[5] Ibid. 1877, No. 25.

[6] "Ziemssen's Cyclopædia," vol. viii. p. 28.

[7] "Krankheiten des Pharynx und Œsophagus." Stuttgart, 1880, p. 122.

[8] "Deutsche Zeitschr. f. Chir." 1882, Bd. xvii. p. 138, et seq.

[9] "Hospitals Tidende." 2 R. vii. No. 43. Copenhagen, Oct. 27, 1880.

[10] Private letter from Dr. Studsgaard to the Author, dated Dec. 21, 1882.

[11] "Hospitals Tidende." Copenhagen, 1882, No. 1.

[12] "Liverpool Med.-Chir. Journ." No. 1, July, 1881, p. 14, et. seq.

The mode of performing œsophagostomy is as follows:—The patient should be placed on his back with his shoulders somewhat raised, and his head turned towards the right side. An anæsthetic having been given, the surgeon, standing behind the patient's head, should make an incision through the skin on the left side from just above the sterno-clavicular articulation to about the level of the hyoid bone. The platysma should be cut through, and if a vein of any size, such as the external or anterior jugular, is met with, it should be divided between two ligatures and turned aside. The superficial fascia should next be slit up on a grooved director along the line of the original incision, and the anterior edge of the sterno-mastoid laid bare. The patient's head should then be slightly raised so as to relax the tissues of the neck, and an assistant should draw aside the sterno-mastoid with a retractor. The omohyoid (which can be recognized by its direction inwards and upwards) having thus been brought into view, should be divided as near to its hyoid insertion as possible. The carotid sheath is now to be held aside together with the sterno-mastoid, whilst the trachea is drawn inwards by a second assistant. The connective tissue having been torn through with the handle of the knife, the left lobe of the thyroid body should be raised and pushed towards the middle line, when the trachea will

[1] "Med. Times and Gaz." July 29, 1882, p. 117.

[2] Private letter from Mr. Reeves to the Author, dated July 20, 1882.

[3] "Sarcoma and Carcinoma." London, 1882, p. 184.

[4] "Wien. Med. Blätter." 1882, No. 17, p. 523.

[5] Gross ("System of Surgery," 6th ed. 1882, vol. ii. p. 495) refers to cases in which œsophagostomy has been practised by Packard and Cohen. As I am unable to find any published details of either of these cases, they have not been included in the above summary.

be fully exposed, together with the œsophagus behind it. It may sometimes be difficult to identify the latter tube, and it may therefore be necessary to pursue the dissection down to the prevertebral muscles. At this stage a sound[1] should, if possible, be passed from the mouth through or into the stricture. By this the operator will be guided to the situation of the gullet, which should be opened by a vertical incision $2\frac{1}{2}$ to 5 centimetres long, through its lateral wall. In cases of cancerous stricture the opening should be made as far below the seat of disease as possible, whilst in cicatricial stenosis the knife may be carried through the contracted tissues. When the tube has been opened a silk ligature should be passed through each edge of the œsophageal wound, and again through the corresponding lip of the cutaneous incision, and the gullet should be gently drawn towards the surface and loosely attached to the outer wound. A curved tube, measuring about three inches in length below and one inch above the bend, with a suitable shield at its upper extremity, should be introduced into the œsophagus through the wound, and fixed in position by means of tapes round the neck. Sutures may be used to bring the edges of the skin-wound together above and below the feeding tube, should this appear desirable.

The food should, of course, be liquid, and in order to prevent it from soaking into the tissues of the neck, when the patient is to be fed, it is better to pass a second long inner tube some way down the gullet, through the shorter tube which is constantly worn. The nutritive fluid may either be injected with a syringe, or poured in through a glass funnel.

Œsophagostomy should never be performed unless there be good reason to believe that it will be possible to introduce a tube into the gullet below the seat of stricture.

On analysing the recorded cases of œsophagostomy, it will be found that out of twenty-six cases in which the operation was performed, sixteen, *i.e.*, 61·5 per cent., died within a fortnight, whilst death from shock occurred within forty-eight hours in seven, or 26·9 per cent. Œsophagostomy has been performed seventeen times for the relief of cancerous stricture, four times for cicatricial contraction, three times for dysphagia caused by compression of the gullet from without, and twice for stenosis of somewhat doubtful character.[1] The longest duration of life after the operation in any of these cases was sixteen months, the shortest eighteen hours.

---

[1] A special instrument was devised for this purpose by Vacca Berlinghieri ("Della Esofagotomia," Pisa, 1820), consisting of a curved hollow sound containing a stylet, which projects two inches beyond the distal extremity of the tube. The sound ends at its lower part in a staff grooved at one side. On pushing down the stylet, its point is protruded and thrusts the wall of the gullet outwards. An ordinary flexible bougie tipped with a metal knob will, however, be found to answer just as well.

In the malignant cases the average duration of life after the operation was rather more than fifty-two days. If, however, Tarenget's case, in which the patient lived sixteen months, be omitted from consideration as too vaguely reported and of too ancient date to be quite trustworthy, the average term of survival in the remaining fifteen instances was twenty-four days. In seven cases of œsophagostomy for cancer, in which sufficiently full details are given for an estimate to be made, the average duration of the symptoms before the operation was six months, the longest being eleven months, and the shortest three months.

In the four cases in which œsophagostomy was done for cicatricial contraction, the average duration of life after the operation was nearly seven weeks. In three of the four, however, the patients were children, and in them the average was little more than two days and a half. This high mortality of the operation in the case of children utterly negatives the opinion that the shock caused by œsophagostomy is inconsiderable.

In the three instances of dysphagia from compression the average period of survival was five months, whilst in the two cases of doubtful nature it was nearly two months.

Death from the immediate shock of the operation took place in four of the cases of malignant obstruction and in two of the cases of cicatricial contraction. The statistics of this operation do not show the steadily progressive improvement which is seen in the case of gastrostomy.

The great *advantages* that are claimed[2] for œsophagostomy are :—

---

[1] Richet's case is too lacking in detail to be taken into account.

[2] Whilst Follin ("Retrecissements de l'Œsophage." Paris, 1853, pp. 125, 126), Terrier ("De l'Œsophagotomie Externe." Paris, 1870, p. 62, et seq.), Annandale ("Liverpool Med.-Chir. Journ." No. 1, July, 1881, p. 13), Bidan ("De l'Œsophagotomie." Bordeaux, 1881, p. 38, et seq.), and T. Holmes ("Med. Times and Gaz." July 29, 1882, p.

1st. That it is attended with comparatively little systemic shock.

2ndly. That it facilitates subsequent dilatation of the stricture; in other words, it is so far curative that it may enable the patient's existence to be indefinitely prolonged.

The supposed absence of shock, however, is not borne out by the actual facts, seeing that in five cases[1] death occurred within twenty-four hours after the operation, whilst in a sixth,[2] the attempt to open the gullet had to be given up, owing to the collapsed condition of the patient. As regards the second alleged advantage, it does not appear that there is any case on record in which an œsophageal stricture has been successfully dilated through an opening in the neck.

The *disadvantages* of the operation are:—

1st. That owing to the depth from the surface at which the gullet is situated, and the fact that when diseased it is often fixed to the surrounding parts, the operation is a very difficult one. (To this should be added, in cases of cicatricial stenosis, that the walls of the organ may be so tough as to make it difficult, or even impossible,[3] to cut through them.)

2ndly. That great *danger* inevitably attends a cutting operation carried out in immediate proximity to such important structures as the large blood-vessels and nerves of the neck, and the thyroid gland, which is not unfrequently enlarged in cases of œsophageal stenosis.

3rdly. That there is great *uncertainty* in any given case whether the opening in the œsophagus can be made below the stricture. (Even when its upper limit can be made out with tolerable accuracy, the extent of the disease cannot even be guessed at, and if in an exceptionally favourable case the lower margin could be approximately ascertained, a second stricture may exist lower down.)

4thly. That a discharging fistula in the neck is a conspicuous disfigurement.

Gastrostomy.—This has been the most frequently practised, and will probably be proved to be the most valuable of all the operations for the relief of œsophageal stricture.

---

118) give a moderate support to the operation, Mr. Reeves ("Trans. Clin. Soc." vol. xv. 1882, p. 29, et seq.) has come forward as an uncompromising champion of it.

[1] Menzel, Poinsot, Kappeler, Horsey, Zenker.

[2] Maydl: Loc. cit.

[3] Maydl: Ibid.

History of the Operation.—Gastrotomy, for the extraction of foreign bodies, has been practised since the sixteenth century, but gastrostomy, or the establishment of a "mouth" in the stomach, for the purpose of feeding a patient who is unable to swallow, was first proposed, and fully described by Egeberg,[1] a Norwegian surgeon, in 1837. It was, however, actually carried out for the first time in France, by Sédillot,[2] in 1849. After him it was performed by Fenger, Cooper Forster, Sydney Jones, Curling, Bryant, Van Thaden, myself, Troup, Durham, Fox, Maury, Low, MacCormac, Jouon, Smith, Clark, Mason, Jackson, Rose, Möller, Jacobi, Hjort, Küster, Tay, Heath, Verneuil, Callender, Schönborn, Lanelongue, Courvoisier, Trendelenburg, Le Dentu, Riesel, Messenger Bradley, Studsgaard, Langenbuch, and Langton. The details of all the operations performed by these surgeons may be found in an elaborate treatise published by H. Petit[3] in 1879. Since the appearance of that work cases have been reported by Littlewood,[4] Milner Moore,[5] McCarthy,[6] Escher,[7] Lücke,[8] Elias,[9] Pye-Smith,[10] Buchanan,[11] Morris,[12] McGill,[13] Gritti,[14] Krönlein,[15] Bryant,[16] Langton,[17] Golding-Bird,[18] Reeves,[19] Kappeler,[20] Anders,[21] Fowler,[22] Bugantz,[23] Maydl,[24] and Hume.[25] Several cases have been operated on by Howse and Davies-Colley, but the details have not been published.

---

[1] Memoir read before the Med. Soc. of Christiania, May 8, 1837.
[2] "Gazette Médicale de Strasbourg." 1849, p. 366.
[3] "Traité de la Gastro-stomie." Paris, 1879.
[4] "Lancet." 1879, vol. i. p. 475.
[5] Ibid. 1879, vol. ii. p. 425.
[6] Ibid. 1879, vol. ii. p. 466.
[7] "Centralblatt f. Chirurgie." Leipzig, 1880, vii. p. 625.
[8] "Med. Times and Gazette." 1880, vol. ii. p. 187.
[9] "Deutsche Med. Wochenschr." Berlin, 1880, vi. pp. 329-333.
[10] "Trans. Intern. Med. Cong." 1881, vol. ii. p. 456, et seq.
[11] "Lancet." 1881, vol. i. p. 7.
[12] Ibid. 1881, vol. ii. p. 873.
[13] Ibid. 1881, vol. ii. p. 942.
[14] "Gazzetta Med. Ital. Lombardia." 1881, serie viii. t. iii. p. 3.
[15] "Centralblatt f. Chirurgie." 1881, p. 16.
[16] "Lancet." 1881, vol. i. p. 572.
[17] "Brit. Med. Journ." July 15, 1882.
[18] "Trans. Clin. Soc." 1882, vol. xv. p. 33, et seq.
[19] Ibid. p. 26.
[20] "Deutsche Zeitschrift f. Chirurgie." 1882, Bd. xvii. Heft 1 and 2.
[21] "St. Petersburg Med. Wochenschr." 1882, xvii. p. 185, et seq.
[22] "Ann. Anat. and Surg." Brooklyn, New York, 1882, vi. p. 27, et seq.
[23] Quoted by Maydl: "Wien. Med. Blätter." 1882, No. 22, p. 682
[24] "Wien. Med. Blätter." 1882, Nos. 15, 16, 17, 18, 19, 21, 22, 23, and 24. Twelve cases are here reported by Maydl, but the actual operator in six of them was Albert.
[25] "Lancet." Dec. 23, 1882, p. 1074.

The following is the best mode of operative procedure:—The patient having been placed on his back, and an anæsthetic having been administered, the surgeon should first try to map out by careful percussion the situation of the stomach. The area of stomach-resonance varies somewhat in different individuals, and also in the same person according to the condition of the viscus itself. In those who have been suffering for some time from partial starvation, the organ is apt to be retracted so as to be altogether covered by the inferior margin of the thorax. To obviate any difficulty from this source the stomach has sometimes been successfully inflated with air before the operation, or ether has been pumped into the viscus from the mouth, or gas has been generated within the organ itself, by the administration, first of hydrochloric or tartaric acid, and shortly afterwards of bicarbonate of soda.[1] When the stricture is not impermeable, any of these plans may be of service, but none of them is necessary.

Gastrostomy should always be done with the strictest antiseptic precautions. There are three stages in the operation: 1, to open the abdominal parietes; 2, to transfix the stomach and secure it to the edges of the wound in the abdomen, and to the integument; and, 3, to open the stomach. Between the second and third stages it is most important that some days should elapse.

1*st Stage*.—An incision should be made through the skin for a distance of two or three inches in a direction parallel to the left costal margins, and about one finger's breadth to their inner side; the centre of the incision being made to fall about three-quarters of an inch internal to the outer edge of the *rectus abdominis* muscle.[2] The lips of the skin-wound should then be held asunder, and the fibres of the rectus should be divided in a vertical direction for about an inch, all hæmorrhage being at once checked by torsion of the vessels, or ligature with fine carbolized catgut. When the parietal peritoneum is reached it should be gently picked up with forceps, and a minute opening should be made in it with the knife. Through this aperture a grooved director should be introduced, on which the membrane is to be slit up in the axis of the incision through the rectus. The peritoneal sac being thus laid open, the stomach will in most cases be at once visible, but sometimes instead of it the omentum, or even the colon, comes into view. The former is not likely to mislead the operator, but as it has actually happened that the colon has been opened instead of the stomach, it is well to be on guard against such an accident. The longitudinal bands, together with the *appendices epiploicæ*, and the thinness of the walls will serve to identify the colon, which should be gently pushed downwards out of the way. Should the omentum present itself in the wound, gentle traction should be made on it until the stomach is brought down so as to bulge out of the wound somewhat like a hernia.

---

[1] Schönborn ("von Langenbeck's Archiv." vol. xxii. p. 500) fitted an india-rubber ball to the end of a fine hollow sound, which he passed down the gullet. When the ball was in the stomach it was inflated by blowing down the tube. Félizet ("Lancet," Oct. 7, 1882), in a case in which he had lately to open the stomach for the removal of a foreign body, passed a small india-rubber tube through one of the patient's nostrils into the stomach. The proximal extremity of the tube was bifurcated, a funnel being connected with one branch, and the other communicating, by means of a piece of tubing, with a recipient containing ether. The stomach was first washed out with a solution of sodium bicarbonate poured in through the funnel, and made to flow out again by depressing the tube below the level of the viscus, so as to make the former act as a syphon. When the patient was fully under chloroform the ether-holder was plunged into a vessel of water, at a temperature of 60° Centigrade, when the stomach at once became distended by the vapour. It is obvious that neither this nor Schönborn's plan could be pursued if the gullet was much narrowed. Jacobi ("New York Med. Journ." 1874, vol. xx. p. 142) passed a fine catheter into the stomach, and injected a solution of bicarbonate of soda, and shortly afterwards a solution of tartaric acid. Fowler ("Annals of Anat. and Surgery," Brooklyn 1882, vol. vi. p. 27), injected thirty drops of dilute hydrochloric acid, mixed with an ounce of water, followed, after an interval of from two to three minutes, by an ounce of a saturated solution of bicarbonate of soda.

[2] Some surgeons prefer to make a vertical incision along the outer margin of the left *linea semilunaris*, commencing immediately below

2nd Stage.—To keep the stomach in a proper position and prevent its falling back into the abdominal cavity during the remaining steps of the operation, the base of the projecting portion should be transfixed in a direction parallel to the surface of the belly by two long needles, the extremities of which should reach considerably beyond the edges of the wound on either side.[1] The stomach is thus held fast between two transverse supports resting on the surface of the body. The viscus should now be stitched to the abdominal wall either by a single or a double series of sutures. Verneuil uses one set of stitches, the sutures, which are of silver wire, being passed first through the skin close to the edge of the wound, next through the parietal peritoneum, lastly through the peritoneal and muscular coats of

---

the edge of the thorax, and continued downwards for three or four inches. The incision through the rectus, as recommended above, was first practised by Mr. Howse, to whom the greater success of gastrostomy in this country in recent years is largely due. The straight fibres of the rectus form a sphincter round the gastric wound, and the dribbling of the contents of the stomach so prone to occur during coughing is thereby prevented.

[1] This plan was first recommended by Verneuil ("Bull. de l'Acad. de Méd." 1876, p. 1025).

the stomach, and out again; the ends are then threaded through a perforated plate, and afterwards through shot drilled for the purpose, when they are fixed by crushing the leaden ball over them with pincers. Howse, on the other hand, prefers a double circle of stitches; the outer, which consists of carbolized silk sutures, passes through the serous and muscular tunics of the stomach, and afterwards through the skin about three-quarters of an inch beyond the lip of the wound, and is here tied over pieces of quill; the inner circle is made with ordinary sutures of fine wire or carbolized silk, and unites the serous coat of the viscus to the skin close to the edge of the incision. The object of the two circles of stitches is to provide a greater area for adhesion, the whole of the zone between the two rings being likely to unite with the abdominal parietes.

3rd Stage.—As already remarked, it is most important to delay this till adhesions have been produced between the corresponding peritoneal surfaces round the wound, and the stomach thereby securely fixed to the abdominal wall. Mr. Howse's method is to defer the third step of the operation till the fifth or sixth day, and by some surgeons[1] an interval of a week or even a fortnight is allowed to elapse between the preliminary part and the completion of gastrostomy. The stomach may be opened by puncturing the centre of the exposed portion with a fine-pointed bistoury. As considerable hæmorrhage has followed this apparently simple proceeding on more than one occasion, the surgeon should be prepared for such a contingency, the occurrence of which is probably favoured by the congested condition of the islet of stomach-wall included within the ring of sutures. Pressure will probably suffice to stop the bleeding, or the risk may perhaps be altogether obviated by opening the stomach with a thermo-cautery point, after the manner of Albert. An india-rubber tube, provided with a plug, may be left in the wound, and kept *in situ* by means of a silver suture, passing through it and the skin on each side, or, as is Mr. Howse's practice, the fistulous opening, which is at first made only large enough to take a No. 6 catheter, may be gradually dilated to the size of a No. 32 instrument (French scale). In either case the wound should be dressed with a pad of lint steeped in carbolized oil (1 in 60), over which may be put an additional pad of boracic lint, the whole being kept in place by means of a body-bandage. The sutures should not be removed for about ten days.

---

[1] Maydl (Loc. cit. No. 15) gives two cases where the interval was fourteen days.

In the interval between the second and third stages of gastrostomy the patient's strength should, if possible, be maintained by rectal alimentation. If, however, aphagia has existed for more than two or three days it may be necessary to do the entire operation in one act.

A few words must be added regarding the manner of feeding the patient after the completion of gastrostomy, as the success of the operation greatly depends on this. Nourishment should be administered in small quantities and at very frequent intervals, and during the first few hours it should be given cold or even iced, in order to check vomiting. The act of feeding should, as far as possible, be an imitation of the natural mode of taking food—that is to say, nourishment should be given in small spoonfuls, about half a minute being allowed to intervene between the helpings. The cause of failure after gastrostomy has undoubtedly sometimes been the unphysiological mode in which the food has been administered. At first the diet should be confined to milk, beef-tea, and a little stimulant: later on, when the stomach has become more accustomed to the novel conditions under which it has to work, light puddings of tapioca or arrowroot, hot milk sweetened with sugar, eggs boiled very soft, beef-tea, and chicken broth may be allowed. Pounded meat or panada may be given when the power of digestion has become established. Trendelenburg[1] advises that the patient should, if possible, masticate the food, and should then blow it through an elastic tube passing from his mouth to the permanent tube in the gastric fistula. The patient has thus the enjoyment of eating, and the digestive process has the advantage of the salivary function.

Many operators have noticed that after gastrostomy the œsophageal stricture yields a little; this is probably due to relaxation of the muscular spasm, and subsidence of the inflammation which almost invariably affects the mucous membrane near the seat of disease. Hence a day or two after the establishment of the gastric fistula, a little liquid food can often be swallowed. In this way the feeding through the stomach may be minimized at first, and that organ gradually habituated to the abnormal method of receiving nutriment.

Gastrostomy has been done sixty-seven times for cancer of the gullet, twelve times for cicatricial stricture, and twice for syphilitic stenosis. On examining the records of seventy-six examples of the operation concerning which I have been able to obtain sufficient details, it appears that the total number of deaths occurring within a fortnight was fifty-five, *i.e.*, 72·4 per cent.

---

[1] "Von Langenbeck's Archiv." 1878, vol. xxii. p. 227.

In the cases of malignant disease the average duration of life after the stomach was opened was rather more than twenty days, the longest period of survival having been six months, and the shortest twelve hours. On looking more closely into the matter, however, it is plain that the results of this operation are progressively growing more favourable. Thus, in thirty-five cases collected by Petit, and extending over a period of thirty years, the average survival of the patient after gastrostomy for œsophageal cancer was slightly more than fourteen days and a half, whilst in thirty-two cases in which the operation has been done for the relief of the same disease within the last three years, the average subsequent duration of life has been more than thirty days. This estimate does not include Howse's cases, which have been alluded to by several surgeons as amongst the most successful operations of the kind that have yet been performed. It should be added that in fifty-seven cases of which a sufficiently detailed account is given, the average duration of the symptoms at the time of the operation was about six months and a half, the longest being three years, and the shortest six weeks.

In twelve cases in which gastrostomy has been done for cicatricial stricture the average of after-life has been more than five months and a half, not including a case of Bryant's, where the result is simply indicated as "cure," without further details. In these cases the average duration of symptoms at the time of the operation had been rather more than five months, the longest period having been one year, and the shortest four weeks.

Lastly, in two cases in which this operation has been done for syphilitic stenosis, the average survival has been slightly over three days, whilst the average duration of the symptoms had been seven months and a half.

In a total number of eighty-one gastrostomies death from shock occurred within forty-eight hours in twenty, *i.e.*, in 24·6 per cent.

The *advantages* of gastrostomy are:—

1st. That it can be carried out with comparative *ease*.

2ndly. That there is very little *risk* in the steps of the operation itself, especially if done in two acts separated by a proper interval of time.

3rdly. That there is almost entire certainty[1] of being able to effect the object aimed at, which is the establishment of an alimentary fistula altogether beyond the seat of stricture.

4thly. That the fistula is hidden from sight.

The only *disadvantage*, on the other hand, is that gastrostomy, with every aid of antiseptic precautions in the actual performance of it, and the improved after-treatment which is now adopted, still yields a high percentage of deaths.

Comparing gastrostomy and œsophagostomy together, it may be affirmed—1st, that gastrostomy is both *easier* and *safer* to perform, the risk of hæmorrhage and other surgical complications being much less; and 2ndly, that gastrostomy *always* meets the difficulty to be overcome—that is to say, the obstruction to the passage of food into the stomach—except in those comparatively rare cases in which the stomach itself is also diseased. The effect of either procedure in relieving the patient's immediate sufferings, notably from thirst, and occasionally, in a less degree, from hunger, is often very marked, and it may be expected that the malady will make less rapid progress when the gullet is no longer exposed to irritation by persistent endeavours to swallow. It can hardly be denied, however, that the benefit of these operations has often been shown more in the euthanasia which they have brought about, than in any appreciable prolongation of the patient's life. In fact, judging from statistics alone, operative interference would seem to be attended with less satisfactory results than the milder palliative measures generally adopted. Thus, whilst the average duration of life in my series of 100 cases[2] of malignant stricture of the gullet in which no operation was attempted was *eight* months, the average extent of life after the first manifestation of distinct symptoms till death in fifty-three cases in which gastrostomy was performed was *seven* months.[3] The records of œsophagostomy for cancer seem at first sight more favourable than either of the above estimates, for in eight cases of which sufficient details are given to form the basis of such a calculation, the average period from the first appearance of dysphagia till death was *ten* months. This result is largely due to Podrazki's case being included. It may be pointed out, however, that the long duration of antecedent dysphagia in this case furnishes no very certain measure of the length of time during which the *cancer* had existed, the patient having suffered severely from syphilis, and the difficulty of swallowing having at first yielded to anti-venereal treatment. Moreover, as the patient survived the operation only two days, it is obvious that the weight which the case apparently throws into the scale in favour of œsophagostomy is altogether illusory. Podrazki's case may therefore be disregarded as being merely a disturbing element in the present calculation. The remaining seven cases of œsophagostomy for malignant disease show an average duration of life of only *seven* months after the first appearance of symptoms.

---

[1] See, however, two cases reported by Maydl (Loc. cit.), in one of which the operator was foiled by finding a large growth in the stomach itself, whilst in another there was a cancerous condition of the fundus and anterior wall of that organ in addition to the œsophageal disease.

[2] See page 73.

[3] It is right to state, however, that the recent records of this operation, taken alone, show much better results. Thus, in twenty cases reported since 1879, the average duration of life from the first onset

On reviewing the whole subject, gastrostomy may be said to have now taken its place among the procedures of every-day surgery, and a hope may legitimately be cherished that as the increasing resources of science render earlier recognition of œsophageal disease possible, the results of the operation will be still more satisfactory in the future. The fatality of gastrostomy has been in a great measure due to the fact that it has often been performed only at the eleventh hour, when the patient was almost moribund—"a species of refined cruelty reflecting no credit on surgery," to use the words of Professor Gross.[1] Œsophagostomy has a much narrower range of usefulness; it is always more or less a "leap in the dark," and though its effect may occasionally be brilliant, it is, after all, an operation more likely to find favour with the adventurous surgeon than with the careful practitioner. In cases of syphilitic origin, however, where the stricture is at the

---

of the disease was seven and a half months, notwithstanding that in one case the period of survival is only reckoned as four months, and in another as ten days, though the patients in each instance were still alive, and likely to live for some time at the date of the report. If the Albert-Maydl cases alone are considered, a still more favourable result will be found. The total average in seven cases was eleven and a half months, notwithstanding that one of the patients still living at the date of report is only counted as surviving the operation six weeks.

[1] "System of Surgery." 1882, 6th ed. vol. ii. p. 495.

upper part of the gullet, œsophagostomy offers a very good prospect of success, as the disease is much more likely to be limited in extent than either cancer or the lesion produced by corrosive fluid. As regards internal œsophagotomy, increased experience will probably show that, though its immediate results are not so frequently fatal, its ultimate effects even when successful are less beneficial to the patient than those of either gastrostomy or œsophagostomy.

The following is an interesting example of cicatricial stenosis of the gullet in which gastrostomy was performed:—

Sarah C., aged twenty-six, swallowed hydrochloric acid on February 16, 1879. She was taken to Guy's Hospital, where the immediate symptoms were treated, but the dysphagia increased so much that on April 24 gastrostomy was performed by Mr. Howse. The patient was fed entirely through the artificial opening for nearly a year, when dilatation of the œsophagus with bougies, which had been found impracticable at an earlier period, owing to the tightness of the stricture, was again attempted. By this means the patient recovered the power of swallowing to such a degree that Mr. Howse allowed the fistulous opening to close, warning her at the same time that it would be necessary to pass a bougie occasionally. She left Guy's Hospital in August, 1880, by her own desire. On September 6 in the same year she came under my care at the Throat Hospital. A No. 2 bougie was passed, and the stricture was gradually dilated till it was large enough to admit a No. 9, and the patient's condition improved considerably. In February, 1881, however, the dysphagia had again become so severe that she had to be taken into the Throat Hospital, where for three months she was confined to bed, suffering from constant pain between the shoulders, which was increased when she tried to swallow. During all this time her temperature was always above the normal point, being often as high as 102° Fahr. in the evening. No cause, however, could be discovered for the pyrexia. After this illness the patient steadily improved for some time, notwithstanding occasional relapses. In the autumn of 1882 her gullet again became almost blocked up, in spite of constant attempts at dilatation, and she gradually lost strength till the early part of November, when she died.

The following are the notes of the post-mortem examination. The body showed little sign of wasting, there being fully an inch of fat on the abdominal walls. Both lungs were adherent to the chest walls. The œsophagus was bound to the prevertebral muscles by bands of dense fibrous tissue, rendering its separation from the surrounding parts very difficult. Barely half an inch below the cricoid cartilage the stricture commenced, and extended downwards to within two centimetres and a half of the cardia. The walls of the gullet throughout the whole of the strictured portion were enormously thickened, the cut edge in some places being an eighth of an inch in width, and very tough. The narrowest part of the stricture corresponded to the upper inch and a half of the gullet (Fig. 20, *a*), and consisted of four longitudinal ridges, mainly situated on the anterior wall, but partly on the sides of the gullet. These ridges almost blocked up the lumen of the œsophagus, which was still further narrowed below by a transverse cicatricial band connecting the longitudinal folds together. Lower down the stricture was made up of a meshwork of bands, most of which had a transverse direction.

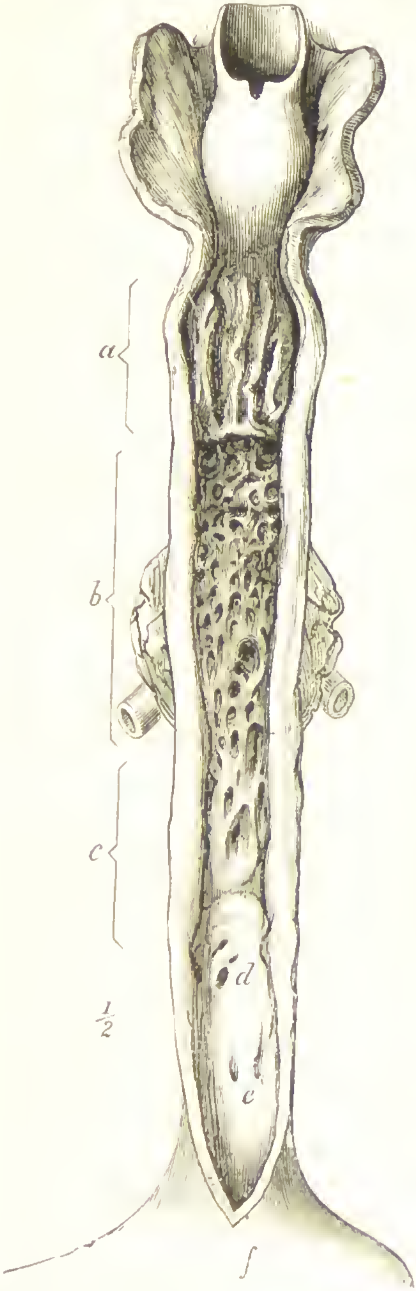

FIG. 20.—TRAUMATIC STRICTURE OF THE GULLET,

Extending from within half an inch of the cricoid cartilage to within an inch of the cardia. Over the whole extent of the stricture the walls of the œsophagus can be seen to be enormously thickened.

a, upper portion of gullet, showing vertical ridges terminating in a raised annular band; *b*, middle portion of the œsophagus, showing a network of fibrous trabeculæ with deep holes interspersed; one of these was a perforating ulcer communicating with the windpipe; outside *b* can be seen some enlarged glands and thickened tissue with the bronchi projecting at either side; *c*, smoother surface, but depressed cicatrices and raised bands still to be seen here and there; *d*, three openings communicating with the small pouch; *e*, two depressions near the cardia; *f*, the stomach.

Seven centimetres above the cardia there were three openings, admitting a large probe, surrounded by some cicatricial bands. These openings communicated with a canal, which ran for two centimetres and a half downwards, and slightly to the right between the muscular fibres, and terminated in a pouch covered with muscular fibres, half an inch long, external to the gullet. Higher up, at a point rather below the middle of the œsophagus, there was a minute perforation, leading into the trachea through its posterior wall. The stomach was 6¼ inches in its smaller curvature, and 12½ in its larger curvature. Its anterior surface measured 3½ inches in its widest part, and 2 inches in its narrowest part.

There was a cicatrix 2½ inches long in the abdominal wall, and on opening the stomach a depressed cicatrix, with radiating ridges, was seen about an inch and a half from the greater curvature, and rather nearer the pylorus than the cardia. The stomach was united to the anterior wall of the abdomen by a dense fibrous tissue.

SIMPLE STENOSIS OF THE GULLET.

Latin Eq.—Strictura œsophagi.
French Eq.—Rétrécissement de l'œsophage.
German Eq.—Verengung der Speiseröhre.
Italian Eq.—Stenosi del esofago.

Definition.—*Abnormal narrowness of a limited portion of the œsophagus without any morbid change in any of its component tissues at the seat of stricture.*

History.—The earliest recorded example of this affection is that of Blasius.[1] More than a century later, Sir E. Home[2] related some instances in which the œsophagus presented a uniform circular contraction behind the cricoid cartilage. Cassan[3] described a case in which the gullet was contracted for a length of eight millimetres. There was not the least change in the mucous membrane at the seat of narrowing, but the pharynx above was increased to double its usual width. Cruveilhier[4] has placed on record a case of simple narrowness of the œsophageal channel at its lower part, while there was a dilated portion above, the inner surface of which was covered with large polypoid vegetations. Wilks,[5] in 1866, and Hilton Fagge,[6] in 1872, have each recorded an example of stenosis at the lower part of the tube, whilst Zenker[7] has lately described a case in which the œsophagus was greatly contracted at its upper part, the mucous membrane in that situation being pale, thin, and loosely attached to the submucosa, but presenting no anatomical change. At the lower part the tube was of normal calibre, but the mucous membrane was unnaturally pale.

---

[1] "Observ. Anat." 1674, p. 170.

[2] "Pract. Obs. on the Treatment of Strictures in the Urethra and Œsophagus." London, 1803, vol. ii. p. 414.

[3] "Arch. Gén." 1826, t. x. p. 79.

[4] "Anatomie Pathologique." Paris, 1835-1842, livr. 38, pl. 6.

[5] "Trans. Path. Soc." 1866.

[6] "Guy's Hospital Reports." 1872, p. 413.

[7] "Ziemssen's Cyclopædia of Pract. Med." English Transl. vol. viii. p. 19.

Etiology.—The origin of this condition is exceedingly obscure. In most of the cases it is stated that the patient had a "small swallow" since childhood, but every practitioner must be aware that this phrase is used in a very vague way, and by numberless people who have no real narrowing of the œsophagus. Although it is highly probable that the condition is a congenital abnormality, I am not aware that there is any instance on record in which its existence in early life has been proved by post-mortem examination. It is possible that the smallness of a portion of the gullet may be simply due to an arrest of growth in infancy or early childhood, or it may result from partial paralysis of a portion of the longitudinal fibres of the œsophagus in infant-life, the frequency of other paralytic affections at that period being an established fact. In cases where the narrowing is at the lower part, there is occasionally some degree of dilatation above, and it may be, under these circumstances, that the original formative material constituting the œsophageal walls has been unequally distributed. Dr. Wilks was strongly of opinion that the dilatation in his case, as well as the stricture, was congenital, but it is scarcely necessary to point out that a congenital stricture is extremely likely to give rise to dilatation higher up.

Symptoms.—In all the cases that have been recorded, although there has been more or less difficulty of swallowing from an early period of life, the dysphagia has remained stationary till not long before death, when, in some instances, disease has developed above the seat of stricture. In Fagge's case, during twenty years the patient had at invervals suffered from complete occlusion of the œsophagus, which on one occasion lasted for a period of eight days.

Regurgitation appears to occur chiefly in those cases in which there is a pouch above the stricture. The patients can generally swallow liquids with ease, but solids have to be washed down with drink. Evidence as to the nature of the affection can be obtained by the bougie and by auscultation, for an instrument of medium size is arrested at the seat of stricture, whilst on listening over the œsophagus, the food can be perceived to reach the point of constriction at the ordinary rate, whilst below this only a trickling or dropping sound can be heard.

Pathology.—In nearly all the cases that have been observed, it is stated that the tissues had undergone no pathological change; but it does not appear that the muscles and nerves of the œsophagus have ever been submitted to microscopical examination in these cases. Disease is likely to be found in the part of the gullet *above* the stricture. Thus, in Cassan's case there were signs of general inflammation, whilst Cruveilhier's, as already remarked, presented polypoid vegetations on the mucous membrane of the dilated sac, and in Fagge's, cancer had become developed in the wall of the pouch.

Diagnosis.—The absence of any traumatic cause of stricture, the continuous existence from early childhood of dysphagia, and the non-progressive character of this symptom, serve to distinguish this class of cases.

Prognosis.—In two instances the patients lived to the age of seventy-four years, and the prognosis is not very unfavourable if great care be taken in the selection of diet. The predisposition to secondary disease above the stenosis, however, must not be forgotten.

Treatment.—It is extremely important in these cases that the patient should take only liquid or semi liquid food of a non-irritating character, whilst stimulants must, as a rule, be avoided. The patient should be enjoined to eat with care and deliberation. Dilatation should not be attempted, as it could only give rise to rupture of one or more of the œsophageal tunics. There remains, therefore, only œsophagostomy or gastrostomy. Considering, however, the non-progressive character of the stricture, these operations are not likely to be called for unless some complication should arise.

COMPRESSION OF THE GULLET.

Compression of the gullet may be effected by any of the organs in its immediate neighbourhood. It is seldom, however, that severe compression is produced, except in the case of constricting or cancerous bronchocele, enlargement of the deep lymphatic glands near the tube, or tumours of malignant character in the neck or in the posterior mediastinum. Neither aneurisms nor dilated heart, as a rule, gives rise to extreme dysphagia. The condition most frequently causing compression is constricting goître. Twice I have known this to cause death by inanition; one of these will be recorded and illustrated under the head of "Goître." I have seen several examples of cancer of the thyroid gland pressing so much on the gullet as to hurry on the fatal termination. In several patients suffering from lymphoma, whom I have been called on to treat, dysphagia has been a troublesome symptom. Cases have been recorded in which compression was produced by thickening of the posterior plate of the cricoid cartilage,[1] and one instance (Specimen No. 132, Throat Hospital Museum) has come under my own notice in which this part measured one centimetre in thickness, and caused death by starvation. In other instances, dysphagia has been attributed to abnormal length of the styloid process,[2] to ossification of the stylo-hyoid ligaments,[3] and to lordosis of the spinal column.[4] Sir Astley Cooper[5] related a case in which great difficulty of swallowing was caused by the sternal end of a dislocated clavicle pressing on the gullet. The dysphagia was at once relieved on the inner end of the bone being sawn off. Morgagni[6] refers to a case in which a soldier, suffering from opisthotonos, was unable to swallow, which he attributes to the over-extension of the gullet, caused by the arching backwards of the neck. It is obviously possible, however, that the œsophageal muscles may have been in a state of tetanic contraction. Some illustrations of compression caused by aneurism have been collected by Knott.[7] In general, however, as already stated, aneurisms of the aorta, even when they impinge on the gullet, do not seriously obstruct the passage of food. Out of fourteen marked cases of aortic aneurism pressing on the œsophagus, brought together by Mondière,[8] in twelve there had been no dysphagia. Perforation, however, not unfrequently takes place in such cases;

---

[1] Travers: "Med.-Chir. Trans." vol. vii.; Gibb: Diseases of the Throat," 1864, 2nd ed. p. 378; Wernher: "Chirurg. Centralblatt," 1875, No. 30; Hadlich: "Deutsche Zeitschrift f. Chirurgie." 1882, Bd. xvii. p. 138, et seq.

[2] "Wien. Med. Wochenschr." No. 5, 1882.

[3] Emminghaus: "Deutsches Archiv. f. klin. Med." Bd. xi. p. 304.

[4] Sommerbrodt: "Berlin. klin. Wochenschr." 1875, p. 334; Heymann: Ibid. 1877, p. 763; Lennox Browne: "The Throat and its Diseases." London, 1878, p. 119.

[5] "Lectures on Surgery." London, 1827, vol. iii. pp. 296, 297.

[6] "De sedibus et causis morb." Epist. xxviii. art. 14. Lugd. Batav. 1767, t. iii. p. 13.

[7] "Pathology of the Œsophagus." Dublin, 1878, p. 217, et seq.

[8] "Arch. Gén." 1833, 2e série, t. iii. p. 51.

and among one hundred and twenty examples of perforation of the gullet, rupture of the aorta occurred in eighteen, whilst the pulmonary, carotid, subclavian, inferior thyroid, and superior intercostal arteries each furnished one instance. Hypertrophy of the heart, and especially fluid effused into the pericardium,[1] sometimes occasions considerable difficulty in swallowing, but the pressure of an enlarged heart sometimes has a totally different effect, and may give rise to hypertrophy of the œsophageal walls. Thus Wilks and Moxon[2] have found "the muscle of the œsophagus thrice its normal thickness" from this cause.

The means of distinguishing between compression of the œsophagus and cancerous stricture, have been pointed out in dealing with the latter subject (p. 90), and as regards the treatment, it is obvious that all remedial measures must be directed against the essential disease. A feeding tube can be introduced in some cases when the normal descent is interfered with, and by this means life may occasionally be prolonged; but it must not be forgotten, that when an aneurism is the cause of the compression, there is some danger in using such an instrument. Œsophagostomy, or gastrostomy, remains as a last resource; and the relative merits of the two methods should be considered, not only *qua* operation (see "Cicatricial Stricture of the Gullet"), but more especially in relation to the nature and situation of the compression.

RUPTURE OF THE GULLET.

Latin Eq.—Diruptio gulæ.
French Eq.—Rupture de l'œsophage.
German Eq.—Ruptur der Speiseröhre.
Italian Eq.—Rottura del esofago.

DEFINITION.—*Sudden bursting of the gullet during prolonged and violent vomiting, giving rise to acute pain in the course of the tube, to extreme dyspnœa, and sometimes even to orthopnœa, to subcutaneous emphysema, and to collapse generally quickly ending in death.*

---

[1] Several interesting cases of dysphagia due to this cause may be found in a short treatise by Bourceret. "De la Dysphagie dans la Péricardite." Paris, 1877.

[2] "Pathology." London, 1875, 2nd ed. p. 364.

History.[1]—The earliest case on record is that related by Boerhaave,[2] in 1724, as an injury of which there was no previous example in medical literature. An abstract of this interesting case will be found at the end of this article. In 1788 a case was reported by Dryden,[3] a military surgeon serving in Jamaica, in which, as in Boerhaave's patient, the gullet had given way under the strain of vomiting. In 1811 Monro[4] stated that he had in his possession the gullet of a child in whom this lesion had taken place, adding that an example of a similar occurrence had been related to him by Carmichael Smyth.[5] Both these cases, however, must be regarded with suspicion for the reason hereafter stated in the short article on "Post-mortem Solution of the Gullet;" a remark which also applies to the following case, but in a less degree, owing to the symptoms observed during life. In 1812 an account was published by Guersant[6] of a rupture of the œsophagus which took place in a little girl, aged seven, during an attack of fever in which there had been much nausea and vomiting. In 1837 a case was related by Heyfelder[7] in which a drunkard died in convulsions, and after death his gullet was found ruptured at its lowest part. This, however, seems to me a very doubtful example of the accident now under consideration. In 1843 Wilkinson King[8] described as an instance of post-mortem digestion of the gullet, a case in which there appears every reason to believe that the tube had been ruptured during life. In 1848 C. J. B. Williams[9] published a case in which not only the œsophagus but the diaphragm had given way under the strain of violent and prolonged vomiting. Examples of this rare injury have also been recorded by Oppolzer,[10] Meyer,[11] Grammatzki,[12] Griffin,[13] Charles,[14] Bailey,[15] Fitz,[16] Adams,[17] and Taendler.[18] All the unequivocal cases of rupture which have been published, amongst which several, though referred to in the above short historical summary, cannot be included, are placed in a table at the end of this article.)

---

[1] Several cases of so-called rupture have been omitted in this place as being too doubtful in themselves or too incompletely described to be of much value. Such cases are those of Kade ("De morbis ventric." Halæ, 1798, p. 17, et seq.); Thilow ("Baldinger's Magazin f. Aerzte." 1790, vol. xii. p. 114); Bouillaud ("Arch. Gén. de Méd." 1823, t. i. p. 531) and Le Ray (Roumegoux, "Essai sur les Plaies et les Ruptures de l'Œsophage." Thèse de Paris, 1878, No. 369, pp. 34, 35). Two interesting but doubtful cases recently reported by Mr. Stanley Boyd ("Trans. Path. Soc." 1882, vol. xxxiii. p. 123, et seq.) do not seem quite to come within the terms of the above "definition."

[2] "Atrocis nec descripti prius morbi historia." Lugduni Batavorum, 1724.

[3] "Medical Commentaries." Edinburgh, 1788, Dec. ii. vol. iii. p. 308.

[4] "Morbid Anatomy of the Gullet, Stomach, and Intestines." Edinburgh. 1811. 1st ed. p. 311.

[5] Dr. Carmichael Smyth was a man of considerable distinction in his profession, and Physician to the King in Scotland towards the close of last century.

[6] "Bull. de la Fac. de Méd. de Paris." 1812, t. i. p. 73.

[7] "Sanitatsbericht uber das Fuerstenthum Hohenzollern-Sigmaringen während des Jahres 1837."

[8] "Guy's Hospital Reports." 1843, 2nd series, vol. i. p. 113.

[9] "Trans. Path. Soc." London, 1848, vol. i. p. 151.

[10] "Wien. Med. Wochenschr." 1851, p. 65.

[11] "Med. Vereinszeitung v. Preussen." 1858, Nos. 39, 40, 41.

[12] "Ueber die Rupturen der Speiserohre." Konigsberg, 1867.

[13] "Lancet." 1869, vol. ii. p. 337.

[14] "Dublin Journ. Med. Sci." 1870, vol. i. p. 311.

[15] "New York Med. Journ." May, 1873.

[16] "Amer. Journ. Med. Sci." January, 1877, p. 17. The case is narrated by Dr. Fitz, who made the autopsy, but the patient had been under the professional care of Dr. Allen.

[17] "Trans. Path. Soc." London, 1878, vol. xxix. p. 113.

[18] "Deutsche Zeitschr. f. prakt. Med." 1878, No. 52.

Etiology.—The immediate cause appears always to be violent retching, in most cases following a heavy meal. In some instances the vomiting was brought on voluntarily with the help of emetics, whilst in others it followed a drunken debauch, or came on in the course of a severe febrile complaint. In two cases, however, the accident seems to have originated in forcible efforts to dislodge a foreign body from the gullet. In one[1] of these the action was reflex—that is to say, it consisted in vomiting; but in the other[2] there was violent *voluntary straining* to expel the impacted substance. In both instances some bleeding took place at the time of the accident, and it is highly probable that a wound was made in the œsophageal wall. It is likely that vomiting only causes rupture when the contents of the stomach cannot be expelled through the gullet at the same rate that they leave the viscus. This want of relation between expulsion and transmission may be due to the abnormal quantity of fluid in the stomach, or to obstruction of the œsophageal canal. It is obvious also that any disease or injury causing softening or atony of the walls of the gullet, or any morbid condition of the tissues surrounding the tube which restrains its normal expansion at any part, would favour rupture.

Analysing these causes of rupture, it may be remarked that in nearly every case of which details on the subject have been published, the stomach was sufficiently full at the time of the accident to have its contents expelled with some force. But it is probable that some temporary obstruction near the upper end of the gullet, preventing the flow of fluid matters from the stomach, is the essential factor in the rupture. To determine the cause of this obstruction is not always possible. In two cases, as already remarked, a foreign body was impacted in the œsophagus, but these were exceptions. In all the others the obstruction, if present, must have been due to something inherent in the tube itself. This is probably to be found in strong contraction of the circular fibres of the gullet at the upper part of the œsophagus. In two cases—those of Fitz and Wilkinson King—there was tetanic spasm, affecting in the one the flexor muscles of the limbs, and in the other the abdominal muscles; and it need scarcely be pointed out that if such a condition existed at the same time in the muscular walls of the gullet, rupture would be likely to take place. In other cases it is probable that the spasm was limited to the œsophageal

[1] Meyer. [2] Fitz.

muscles. Absolute obstruction, however, is not necessary; if the contents of the stomach pass into the gullet more quickly than they can escape a rupture may occur. It must be borne in mind that the upper two-thirds of the œsophageal canal are covered by striped muscular fibres, whilst the lower third has only unstriped fibres; and that whilst electrical shocks throw the former into violent contraction, the latter only take on gentle peristaltic action.[1] The lower portion of the tube would, therefore, be less capable of resisting pressure from within, and more likely to rupture. It is possible, however, that in some cases the obstruction is not caused by muscular contraction, but is due to the unyielding character of the pharyngeal orifice of the gullet, protected anteriorly by the cricoid cartilage, and behind by the vertebral column.

Supposing, then, an obstruction to exist at the upper end of the tube, it becomes interesting to ascertain what strain its walls will withstand when the contents of the stomach are thrown violently into the canal. In order to determine the *bursting-point* of the gullet, I made the following experiments with the assistance of Mr. Charles L. Taylor:—The upper end of a healthy œsophagus, removed from the body shortly after death, having been tied, water was thrown in at the opposite orifice by means of a forcing-pump provided with a pressure-gauge. The average pressure at which the tube gave way was rather over seven pounds, the highest being eleven and the lowest five and three-quarters. Among the subjects from whom the gullets were taken there were eight males and four females; their average age was between thirty-eight and thirty-nine years, the oldest being sixty-six and the youngest seventeen. In three of the twelve cases the rupture occurred about an inch above the ligature, *i.e.*, speaking roughly, about two inches above the cardia; in eight, the rent took place at a point one to two inches higher, whilst in one case the gullet burst just above the junction of the lower and middle thirds. In every instance the solution of continuity was vertical in direction, and varied from a third of an inch to nearly two inches in length. These experiments imitated, as far as possible, the expulsion of the contents of the stomach through the gullet in violent vomiting, and produced a condition exactly like rupture, as it occurs during life—that is to say, a vertical rent with clean-cut edges at the lower part of the gullet. Thinking it possible that the occurrence of the rent in the lower portion of the gullet might have been due to the injection having been made near that part, the experiment was reversed, and the cardia having been tied, the injection was made from above. In five out of six trials[1] the rupture occurred within three inches of the cardia, and only once higher up.

---

[1] Todd and Bowman: "Physiological Anatomy." London, 1859, vol. ii. p. 189.

The conclusions to be drawn from these experiments are: 1st, that rupture by direct pressure applied within the gullet always takes place in a longitudinal direction: 2ndly, that the rent never occurs in the upper half of the tube, and in most cases is confined to the lower third; 3rdly, that the mucous membrane offers greater resistance to strain than the muscular covering. As regards the actual production of the rent, the following seemed to be the sequence of events: as the water was pumped in, the tube became distended, especially at the lower part, where the muscular coat became gradually blanched from stretching; next, in eleven of the eighteen cases, the muscle and the mucous membrane gave way together, the former presenting a somewhat irregular fissure with ragged edges, and often with nerve-fibres stretching unbroken across it, whilst the mucous membrane showed a clean straight slit, as if it had been cut with a knife. In the remaining seven cases the rupture took place gradually, the muscular bundles first separating at one place, and leaving an interval through which the mucous membrane bulged out in a hernia-like sac, which was stretched to an extreme degree of tenuity before giving way. In all the eighteen cases the laceration of the mucous membrane was from a quarter to half an inch shorter than the fissure in the muscular coat.

There is no difficulty in showing that the walls of the tube have, in several of the published cases of œsophageal rupture, been in an abnormal condition. In one[2] of them there was slight cicatricial stricture of the gullet near the cardia; whilst in another[1] it is stated that the patient had had occasional difficulty in deglutition since infancy; and in a third[2] that the food could only be taken in small morsels and slowly for some years before the accident. In the two cases in which foreign bodies had been impacted, it is extremely probable that some injury was done to the wall of the gullet which lessened its power of resistance. Although in most of the other examples the mucous membrane is said to have been perfectly healthy, except as regards digestive solution, it may be pointed out that all the patients were men, and that most of them had been accustomed to the free use of ardent spirits, and had suffered from habitual vomiting—circumstances which would have been very likely to lead to slight, though perhaps not apparent, changes in the textural firmness of the lining tunic of the gullet. In one of the most recent examples[3] of this accident a small, white, stellate cicatrix was found beside the lower part of the rent, and further down there was another smaller scar, showing that ulceration had previously existed. It is highly probable, therefore, that the texture of the lining membrane of the gullet was somewhat weakened, and that the canal itself was slightly dilated. In certain instances there may likewise have been some change in the muscular coats of the œsophagus or some impairment of innervation—conditions which would, doubtless, diminish the power of resistance to strain. From the previous habits of life of those who have suffered from rupture of the œsophagus, it is likely enough that some of them were the victims of gout. As regards one patient[4] it is expressly mentioned that this was the case.

---

[1] In the six cases in which the injection was made from above, the average bursting-point was a trifle over six pounds, the maximum being eight, and the lowest just under five. The subjects were all of the male sex, and their ages averaged nearly forty-nine years, the oldest being fifty-nine, and the youngest twenty-six. The direction of the rent was vertical in every case, and its situation was from one to three inches above the point of ligature in five of the cases, whilst in the remaining one the œsophagus gave way exactly midway between the cricoid cartilage and the diaphragm. The rupture occurred four times in the posterior wall, once in the middle line in front, and once on the left side of the tube, the length of the rent varying from three-quarters of an inch to an inch and a half.

[2] Meyer.

Although it is not stated in any of the accounts that the œsophagus was bound down externally at any point, yet it is quite possible that in some cases there may have been small unobserved cicatrices in the peri-œsophageal tissue, which would have deprived the tube of the natural mobility which no doubt helps it to bear the strain occurring during vomiting.

It remains now to consider the various other views which have been put forward as to the etiology of rupture.

Boerhaave, arguing from his unique observation, attributed the rupture to direct traction on the gullet in the act of vomiting, the lower end of the tube being drawn down by the weight of the overloaded stomach, aided by the rigid contraction of the diaphragm, whilst the superior extremity was forcibly stretched above by the straining efforts induced by tickling the fauces. As in Boerhaave's case there was a *transverse* rupture, it is highly probable that his explanation is correct. It does not, however, meet the other cases, in all of which the rent was *vertical*.

---

[1] Charles. [2] Fitz. [3] Adams: Loc. cit. [4] Boerhaave.

Zenker and Ziemssen[1] consider that the accident results chiefly from "*intra-mortem* œsophageal malacia," or softening of the coats from peptic solution in the last hours of life. With a view of testing the *traction-power* of the gullet, Ziemssen[2] suspended an œsophagus, freshly removed from the body of a powerful man, aged fifty-five, and attached weights to the lower end. It was found that, although the muscular coat gave way under a weight equal to five kilogrammes, the mucous membrane remained uninjured under a weight of twelve and a half kilogrammes. Ziemssen argues from this, that no amount of strain that could be applied within the body would cause rupture of the gullet when its tissues are in a healthy condition, or, in other words, until softening has been produced by the digestive action of the gastric juice. I have repeated this experiment in four cases with the following results:—In the first the gullet (taken from a man aged sixty-four) began to stretch at a weight of six kilogrammes, and the muscular coat gave way close to the upper end on the addition of one kilogramme. At this time the tube had lengthened fully two inches; after a weight of eight kilogrammes had been attached to it the gullet continued to stretch for a few seconds, when it ruptured close to the upper end. In the second case the œsophagus was taken from a woman aged sixty; the tube stretched a little, but without rupture, as weights were gradually added, up to nine kilogrammes, when both the muscular and the mucous coats gave way with a sudden snap close to the lower extremity. The third experiment was made on an œsophagus taken from the body of a woman aged thirty; the tube began to stretch under a weight of seven kilogrammes, and finally gave way at the upper end under a total weight of eleven kilogrammes. The fourth experiment was made with the gullet of a woman aged fifty-four, which was torn asunder suddenly close to its lower end when a weight of six kilogrammes had been attached to it.

The average point of rupture under tension, therefore, in these four cases was eight and a half kilogrammes, *i.e.*, about eighteen pounds, the greatest resistance being eleven, and the least being six kilogrammes. The average age of the subjects was fifty-two. Hence it is probable that in Ziemssen's case the resistance was somewhat exceptional, and the varying results show, as was probable *à priori*, that there is a considerable difference in the strength of the human gullet. If, however, we accept the highest power of traction, viz., twelve and a half kilogrammes, I do not think it at all impossible that it will be found to be exceeded by the combined expulsive power of the diaphragm and the strong abdominal muscles. Moreover, it must not be forgotten that in these experiments just described the force was *gradual*, and was applied in a totally different way to that which occurs during life, when fluid is dashed violently and suddenly against the inner walls of the œsophagus.

---

[1] "Cyclopædia of Medicine," vol. viii. p. 100.
[2] Op. cit. vol. viii. p. 96.

The foregoing experiments, which merely show the *traction-power* of the gullet, though of value in relation to Boerhaave's case, in which the solution of continuity was horizontal in direction, have no bearing on any of the other recorded cases, in all [1] of which the rent was vertical.

Zenker and Ziemssen [2] further call attention to the occasional tearing of the pleura which, they consider, "forces them" to accept the theory of œsophagomalacia. They think that the repeated efforts at vomiting cause the regurgitated food and gastric juice to remain in the gullet sufficiently long to give rise to digestive softening of its walls, and that the faint condition of the patient produces "spastic ischæmia," a condition commonly expressed by the blanched face of a person who is vomiting. This explanation appears to me somewhat far-fetched, for vomiting, with its accompaniment of so-called spastic ischæmia, is a very common occurrence, while rupture of the gullet is one of the rarest of accidents. It is further negatived by the fact that the lesion generally takes place when the stomach is loaded with food or drink, and therefore when the gastric juice is extremely diluted. The suddenness of the event, and the fact that the lesion has usually been produced when the patient was in the upright position (in which case the gastric juice could not remain in the gullet), render it highly improbable that *ante-mortem* peptic softening can be the cause of the injury. Further, were the rupture caused by digestive solution, whether before or after death, it is probable that the opening would be more or less irregular, the edges of the wound being "ragged and fringed with flocculent shreds of half-dissolved tissue" (see "Post-mortem Digestion"), and not a longitudinal rent with sharply-cut edges, such as almost invariably occurs when the accident results from vomiting.

---

[1] In Wilkinson King's case the direction of the rent is not stated

[2] Op. cit. p. 97.

An attempt was make by Wilkinson King[1] to prove that no such lesion as rupture of the œsophagus during life ever occurs, the supposed symptoms of such an accident being, according to him, due to other conditions, and the rent found after death resulting from post-mortem softening. This theory was based mainly on the following case, to which I have alluded in the historical summary as an undoubted example of rupture during life :—

> A cabinet-maker, aged twenty-four, who had been very intemperate for years, *had complained for many months of severe epigastric pain and sickness*, and had also been troubled by loss of appetite and flatulence. While at a public supper, at about 9 o'clock in the evening, he felt sick, and soon afterwards left the table. He vomited slightly, and had to be assisted home. Castor oil was then administered. When first seen by a medical man (at 3 a.m.) the patient complained of great pain at the pit of the stomach, the abdominal muscles were rigidly contracted, he could only breathe when sitting up in bed and leaning forwards on his hands, whilst his countenance expressed the greatest anxiety. Emetics (antimony and ipecacuanha) were given without effect. At 7.30 the pain was less severe, but the dyspnœa was much worse, and there was emphysema of the face, throat, and chest ; another emetic was given, and an enema was administered, both without effect. The stomach-pump was used at 10 o'clock without result ; death took place at noon—that is to say, fifteen hours after the patient had sat down to supper.
>
> *Post-mortem.*—"A large rent was found in the gullet as it passes through the diaphragm, filled with ingesta from the stomach (*sic*). There was food in the posterior portion of the chest."[2] The left end of the stomach was softened by digestion. The lungs on both sides seemed congested, the left being "contracted :" there was some dark offensive fluid with castor oil floating on it in the left side of the chest. A small quantity of plastic lymph was found inside the pericardium, but the heart was healthy.

Wilkinson King himself admits the imperfection of the report of the case, observing that it was compiled from "the *hasty notes* of Mr. Comley." It is conceded that the patient died very suddenly, *i.e.*, in fourteen hours after the first marked symptom, that he vomited, and that a rent was found in his gullet after death, yet King thinks it more reasonable to attribute the death to "sudden inflammatory tumefaction of the larynx," of which there is not any evidence whatever in his published record of the autopsy. The extensive emphysema is in like manner ascribed to a "rupture of the air-tube," of which again there is no mention in the account of the post-mortem examination. No attempt is made to explain the other features in the case, such as the inability to vomit and the acute pain in the epigastrium.

---

[1] "Guy's Hospital Reports." 1842, p. 139, and 1843, p. 113.

[2] The *ipsissima verba* are given, as the passage is somewhat involved, but the author probably meant that a space, *i.e.*, the pleural cavity, communicating with the rent (not the rent itself), was filled with ingesta.

My own view is that the vomiting was much more severe than it is said to have been in the "hasty notes" of the case, or that the epigastric pain, from which the patient had suffered for some months, was due to *ulceration of the œsophagus*, and that therefore its walls gave way under much less strain than in the other instances. If this latter explanation be correct, the case would closely resemble that reported by Mr. Adams.

The almost universal occurrence in these cases of subcutaneous emphysema closely following the patient's own sense of some grave accident having befallen him, is a strong argument against the theory of post-mortem digestion. It is well known that even in ordinary respiration some air is drawn into the gullet, and when dyspnœa is present (as in most cases of œsophageal rupture) the quantity of air thus *swallowed* is probably considerable. Hence, should a rent occur in the tube, it is clear that subcutaneous emphysema would be almost sure to take place. In the cases in which the bowels were distended with flatus (as in those of Boerhaave, Meyer, Wilkinson King, and Charles) it is not improbable that the gas was formed in the intestinal canal. Instead of accepting these obvious sources, Wilkinson King remarks that the pericarditis began before the dyspnœa, and says, "I impute to the latter the production of emphysema, though by no means definitely. We know that violent efforts of respiration rupturing the air-tube do cause the extravasation of air into the cellular tissue as well as the fracture of the rib" (*sic*). This passage is somewhat involved, but I gather from it that King attributes the emphysema to a rent in the trachea, although, as already remarked, there is not the slightest allusion to any such lesion in the account of the post-mortem examination. It will be seen that the views of King do not deserve serious consideration, and they have only been refuted because they have so often been referred to by medical writers, who have evidently not read the original article.

It need scarcely be pointed out that the presence of the gastric contents in the mediastinum or pleural cavity, does not in any way militate against the theory of rupture from violent contraction, nor support that of *post-mortem* or *intra-vitam* digestion of the œsophageal walls, for if the vomiting continue after a rent has taken place, the gastric juice and the contents of the stomach will be forced through the aperture, and may be found after death in the mediastinum, or in one or both pleural cavities.

Symptoms.—As already remarked, the accident usually occurs during vomiting after a full meal or a drunken carousal. The patient suddenly feels as if something had given way, his face becomes blanched, and expresses extreme anxiety; cold sweat breaks out over the body, and there may even be syncope. Excruciating pain is often felt along the course of the œsophagus or in the epigastric region, or occasionally shooting through from the ensiform cartilage to the back. This last symptom, however, is not invariably present at the time of the accident; but, as in Fitz's case, may be deferred for some hours, probably showing that the actual rupture did not take place at the first onset of the symptoms. The patient, who has previously been retching, suddenly becomes unable to empty his stomach, or can only with the greatest difficulty bring up a small quantity of the liquid that has been swallowed.[1] In three cases[2] it is mentioned that the patient could endure his suffering only when supported in a half upright position, with the body bent slightly forwards. The least movement generally aggravates the pain. In nearly every instance subcutaneous emphysema has been observed, usually beginning at the root of the neck anteriorly, and extending more or less over the body. In Meyer's case, however, this was first noticed on the right side of the face. Sometimes the patient complains of thirst, and he can generally swallow with ease, although the greater part of the fluid probably passes into the mediastinum.

Pathology.—The rent in the gullet has, in every recorded case, been at the lower end of the tube, and in all but one[3] it has been longitudinal in direction. The exception occurred in the memorable instance related by Boerhaave,[4] an abstract of which is given further on. In this case the two ends of the tube seem to have been drawn apart. In the other cases the rent varied from two to five centimetres in length. In most of them the gullet was torn only at one place, but in that observed by Grammatzki[1] a second longitudinal fissure was found on the opposite side of the tube, involving, however, only the mucous membrane. Externally to the opening there is usually a cavity in the mediastinum, containing a discoloured fluid, and in some instances fragments of food. Often this space, in its turn, communicates with one or both pleural cavities, which also frequently contain a large quantity of the fluid drunk during the last hours of life, but discoloured with blood and softened tissue. In Boerhaave's case no less than 104 ounces of this fluid were removed from the thoracic cavity. In the examples reported by Wilkinson King[2] and Charles,[3] the greater curvature of the stomach was very much softened.

---

[1] For exceptions see Foot-note 1, p. 172.

[2] Boerhaave, Meyer, Grammatzki.

[3] See Foot-note 1, p. 167.

[4] Loc. cit.

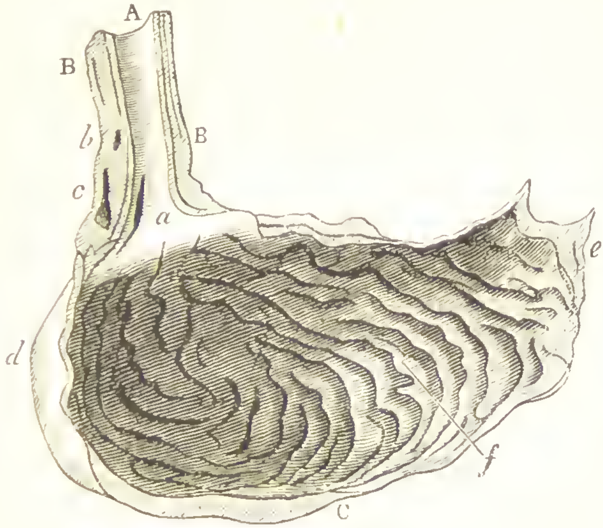

Fig. 21.—Charles's Case of Rupture of the Œsophagus (after Knott).

A, the lower part of the œsophageal canal; B, the external wall of the gullet; C, stomach; *a*, longitudinal fissure reaching through all the coats of the œsophagus; *b*, small aperture communicating with left pleura; *c*, large irregular aperture, probably accidental; *d*, fundus of stomach, mucous membrane very soft and dark; *e*, pylorus, near which the mucous membrane is red; *f*, very prominent rugæ.

Diagnosis.—Boerhaave[4] remarks that from the description of his case any future accident of the kind could be recognized. This, however, has not proved to be the fact, for in no single instance, except that of Meyer, has the nature of the lesion been recognized during life. The diagnosis has been laid down somewhat dogmatically by Oppolzer,[5] who states that rupture of the gullet may be conjectured to have taken place when previous signs of an affection of the œsophagus having been present, there suddenly occurs violent pain along the course of that organ, with expuition of blood, great shock, and inability to vomit.[1] The "previous signs of an affection of the œsophagus" have not, however, in the recorded cases been sufficiently obvious to attract attention. Hamburger[2] suggests that auscultation may be of use, but it is extremely doubtful whether any trustworthy information can be gained by this method in such cases.

---

[1] Loc. cit. [2] Loc. cit. [3] Loc. cit. [4] Op. cit. p. 60.

[5] "Vorlesungen über specielle Pathologie u. Therapie." Erlangen, 1872, Bd. ii. Lieferung i. p. 151.

Prognosis.—All the reported cases have ended fatally, the patients generally dying within a few hours of the rupture, though in one case life was prolonged for some days. In one instance[3] the patient died in four hours, in two[4] in seven hours, in two others[5] in twelve hours; in other cases death took place in thirteen,[6] fourteen,[7] seventeen,[8] eighteen and a half,[9] and twenty-four[10] hours respectively. In one case, however, the patient did not succumb till fifty hours[11] after the accident, and in another,[12] in which the rent was probably very small at first, and afterwards extended, life was protracted for nearly eight days, during which the sufferer passed through a sharp attack of *delirium tremens.*

Treatment.—Directly the rent occurs it might be worth while to introduce the permanent œsophageal tube (Vol. ii. Fig. 10, p. 22). It must be admitted, however, that the instrument would be not unlikely to pass through the rent into the mediastinum; and that should this accident be avoided, the introduction of the tube would probably give rise to attempts at vomiting. But if the instrument can be tolerated, it is within the range of possibility that a small and extremely narrow rent might heal. If, however, the patient be unable to bear the tube, it will be necessary to feed him entirely by nutrient enemata. The fact that Allen's patient lived for more than seven days shows that sometimes, at least, there is time for the employment of therapeutical measures, amongst which the administration of anodynes must be considered the most important.

---

[1] Baron de Wassenaer was slightly sick several times after the accident, and in the case of Bailey's patient, efforts at vomiting continued till death. Allen's patient also vomited the contents of his stomach frequently after surgical emphysema had occurred.

[2] "Klinik der Œsophaguskrankheiten." Erlangen, 1871, p. 189.

[3] Taendler. [4] Charles and Adams. [5] Dryden and Grammatzki.

[6] Williams. [7] Wilkinson King. [8] Griffin. [9] Boerhaave.

[10] Bailey. [11] Meyer. [12] Fitz.

ABSTRACT OF THE CASE OF RUPTURE OF THE ŒSOPHAGUS OBSERVED BY BOERHAAVE.

(The original occupies seventy closely-printed pages.)

The subject of this accident was Baron de Wassenaer, a man over fifty years of age, and of powerful frame, whose appearance betokened perfect health. In his youth he had frequently suffered from "angina," and for many years during the winter he had been subject to gout, attributed by himself to over-eating and want of exercise. After a full meal he always felt a sensation of great weight at the pit of the stomach, and to relieve this he was in the habit of taking ipecacuanha in a copious infusion of blessed-thistle,[1] though he sometimes used the latter beverage alone.

At the time of the accident which caused his death, Baron de Wassenaer was atoning by *low diet* for an excess at table committed three days before, and a glance at his last meal—an early dinner—may give some idea of the character and amount of his food when he was not stinting his appetite. It has long been supposed that the Baron was a gross feeder, but after a careful perusal of the case, so eminent an authority as Professor von Ziemssen does not think this opinion warranted by the facts. An examination of the following list, which does not represent the bill of fare, but only that portion of it which was partaken of by the Baron, will enable the reader to determine for himself a matter which has an important etiological bearing on the case:—

Dinner.
Veal Soup, with Herbs.
Boiled Lamb and Cabbage.
Fried Sweetbread and Spinach.
Duck.
Two Larks.
Compote of Apples.

Dessert.
Pears, Grapes, Sweetmeats.

Beer and Moselle.

In justice to Baron de Wassenaer it must be stated that he does not seem to have eaten largely of any of these viands, except perhaps of the duck, of which he took a leg and breast. In the afternoon he went out riding, and returned in his usual health. No supper was taken, but about half-past ten in the evening, he began to complain of the old disagreeable feeling about the stomach, and he swallowed three tumblerfuls of a hot infusion of thistle. As this did not act with its usual efficacy, he took four more glasses of the same infusion, but still without effect. Much surprised at this, the Baron ordered another dose to be prepared, and in the meantime strove to excite vomiting by tickling his fauces. Whilst straining violently he suddenly felt a horrible pain, and gave such a cry of anguish that his servants hastened to his assistance. He exclaimed that something had burst or been violently displaced near the pit of the stomach, and that he was sure he must die immediately. He was put to bed in a state of utter prostration, being pale, bathed in cold sweat, and pulseless. Half an hour after the seizure he swallowed four ounces of olive oil, and with the help of his finger succeeded in vomiting some of the oil together with a certain quantity of the thistle-infusion. Two ounces more of olive oil, however, produced neither nausea nor vomiting, and the pain increased. Shortly afterwards the Baron drank about six ounces of warm spruce-beer.

---

[1] *Carduus* or *Cnicus Benedictus.* This herb was once much used as a febrifuge and tonic and as a mild diaphoretic. The infusion is said to induce vomiting, or rather to assist the action of emetics, but probably it has much the same effect as warm water.

On his arrival Boerhaave found the Baron sitting in bed, with his body bent forwards almost double. Three servants supported him in this attitude, as every other posture, especially sitting or standing upright, caused excruciating agony. On examining his patient, Boerhaave found that there was nothing to be seen in the throat: there was no nausea, scarcely any eructation, the breath was not offensive, there was neither pain nor difficulty in swallowing, there was no thirst, and the feeling of weight about the stomach was no longer present.

No swelling or hardness could be detected in the chest or abdomen. The urine was natural, and could be passed without difficulty. The patient's body seemed to be of normal temperature, the pulse quick and full, but regular, the breathing and sound of the voice natural. There was frequent deep sighing, but no cough. The colour of the Baron's face was natural, his mind was quite clear, and there was no paralysis. In short, the only sign of disease was the agonizing pain felt by the patient, and an indefinable sense of some change in the situation of parts within the chest. The pain was situated at first in the epigastric region, and was described by the patient himself as a feeling of some sensitive membrane having been torn; it never ceased, and hardly abated for an instant. Later on, the pain, without leaving its original seat, extended backwards, then along the sides, and finally over the whole inner wall of the chest. The patient stated that flatulence caused extreme suffering, the gas apparently not finding its way up; he could feel it leave the stomach, and then almost immediately experienced an excruciating pain in the chest. The physician in vain sought for a satisfactory explanation of the phenomena, the possibilities of "internal inflammation," thoracic tumour, displacement of parts, poison, and gout being successively considered and dismissed.

Boerhaave was inclined to give a hopeful prognosis from the absence of any symptom of disease except pain, which, in spite of its atrocious severity, he did not think would be sufficient to cause death. With the view of diminishing his agony the patient was bled almost to syncope, but this measure failed to give the slightest relief. Poultices, applied near the stomach, made his sufferings worse. Anodyne draughts were administered, but the use of narcotics was avoided, as tending to lessen excretion. The bowels were emptied by enemata. The voiding of urine was diminished to a few drops, passed with great straining and a sensation of scalding. The urine was thick, red, and strong-smelling, these characters proving to Boerhaave's mind that none of the abundant quantity of fluid which the Baron had swallowed could have reached the kidneys. The heart now (sixteen and a half hours after the seizure) began to fail, the face grew pale, the extremities cold, the breathing became hurried, and though the patient's mind continued clear, death seemed imminent from mere exhaustion. As a last resource, thinking that possibly the cardiac orifice of the stomach was obstructed by undigested food, Boerhaave ordered two ounces of sweet almond oil, to be followed by seven ounces of warm water, and directed that the action of the remedy should be assisted by tickling the fauces with a feather dipped in oil. As the result of this, a little dark liquid was thrown up, but none of the oil returned, and no relief was obtained. Here it may be mentioned that there had been no hiccough during the whole course of the affection. Boerhaave was still inclined to believe that the upper orifice of the stomach was blocked up; on reckoning up the large quantity of drink taken by the patient, and the small amount vomited up or passed as urine, it seemed clear that the fluid could not have reached the stomach. A swelling was now observed in the epigastrium, which seemed to confirm this view. Shortly after the administration of the last emetic, eighteen and a half hours from the beginning of his cruel suffering, the Baron showed signs of collapse, and, rather to the surprise of his physician, suddenly expired.

Autopsy twenty-four hours after death.—A large livid stain was seen on each side of the thorax, with black patches here and there. There was emphysema all over the front and sides of the chest. The abdomen was inflated and extremely tense. On opening it, the peritoneum, intestines and stomach were all found enormously distended with air, but to Boerhaave's extreme amazement, the latter viscus contained only a few drops of reddish-brown fluid. The bladder was empty and contracted. On opening the chest cavity Boerhaave, who at the time knew nothing of the nature of the patient's last meal, remarked a strong smell of roast duck. The pleural sacs were found distended with gas, the lungs collapsed and almost bloodless. In each side of the chest there was a large quantity of fluid resembling that previously seen in the stomach, mixed with some of the thistle-infusion. Floating on this was the almond oil ordered by Boerhaave, but, on careful examination, not a drop of blood or pus could be seen. The fluid collected from both sides of the chest measured 104 ounces (Amsterdam measure). On the part of the pleura covering the left side of the œsophagus, at a distance of two inches from the diaphragm, there was a discoloured patch about three inches in diameter, in the middle of which a fissure was perceived half an inch in length, and three lines in breadth. This fissure was found to communicate with a space in the mediastinum, from which the retracted ends of the ruptured œsophagus had been drawn asunder in opposite directions. The most minute inspection failed to show the least sign of ulcer or other disease in the œsophagus; Boerhaave emphatically states that though he searched in the expectation of finding some pre-existing lesion of the gullet-walls to explain so unprecedented an accident, the more he looked at the edges of the rent and the surface of the œsophagus near them, the more perfectly healthy they seemed to be. The stomach was also quite free from disease.

ABSTRACT OF DR. FITZ'S CASE OF RUPTURE OF THE GULLET.

The patient was a man aged thirty-one, whose constitution was much impaired by the abuse of alcohol. For several years he had cut his food into small pieces and eaten it very slowly, but he had experienced neither pain nor difficulty in swallowing. About a year previous to the accident he had suffered from *delirium tremens*, followed by very obstinate gastritis, from which, however, he recovered, but a few weeks before his death he had another attack of inflammation of the stomach. On both occasions the vomiting was distressing, and was accompanied by hæmatemesis.

At supper one evening he was suddenly "partially strangled" by a piece of food which lodged in his throat. There was intense discomfort, but no cyanosis or dyspnœa. About an hour after the occurrence, by straining with his whole strength, he succeeded in dislodging the impacted substance, which was shot out with considerable noise, as if discharged from a popgun. It proved to be a piece of gristly meat one inch in length, and rather more than half an inch in diameter. The patient then fell back exhausted, and spat up some liquid and clotted blood. A swelling (emphysema) was soon afterwards observed at the angle of the jaw on the left side, and a little later a similar swelling appeared on the right side, the two soon extending and meeting across the front of the neck. The patient was thirsty, and could swallow fluids easily. He did not complain of pain, but his face had an expression of great anxiety. There was some tenderness on the left of the trachea just over the clavicle. There was slight nausea, and the patient had vomited about an hour after the accident, there being no blood in the matters brought up. He was drowsy, but could not sleep. During the night pain came on in the left side of the chest, and also in a less degree on the right side, and at the upper part of the back; the swelling of the neck extended down the arms to the fingers and over the front of the chest, the skin being tense, hard, and dark, and having the appearance of erysipelatous inflammation. There was tenderness on both sides of the trachea, and ropy mucus mingled with blood was constantly expectorated. *The contents of the stomach were frequently vomited*, sometimes mixed with blood.

The treatment consisted of hypodermic injections of morphia together with bismuth internally, and a mustard poultice over the stomach. Ice was given to assuage the burning thirst, cooling lotions were applied to the swollen skin, and the patient was fed with milk and beef-tea. During the next two days there was little change in his condition: the emphysema had spread over nearly all the subcutaneous tissue of the body. The bowels and kidneys acted regularly. The patient was very weak and restless, but Hoffmann's anodyne seemed to give him relief. During the fourth, fifth, and sixth days he passed through an ordinary attack of *delirium tremens*, falling into a deep stertorous sleep on the evening of the sixth day. He could retain the food and stimulants given to him. On the seventh day he passed three bloody stools, and had three fits of "cramp," each lasting for half an hour. They began with trembling of the limbs, which was followed by rigid and painful contraction of the flexor muscles. There was excruciating pain over the heart and stomach, together with apparent dyspnœa; the countenance expressed great terror, but there was no loss of consciousness. After each fit there was profuse cold sweating. On the eighth day, after a quiet sleep, the patient woke up quite rational. He took some nourishment and a little stimulant, but became more and more prostrate, and died quietly just seven and a half days after the beginning of his illness.

Autopsy by Dr. Fitz forty-eight hours after death.—The anterior mediastinum was emphysematous. The right lung was partly adherent to the chest-wall by recent fibrinous exudation. There was a cheesy nodule in the apex of the right lung, and a similar deposit in the upper lobe of the left lung.

In front and to the right, from the level of the bifurcation of the trachea downwards, the œsophagus presented a longitudinal rent two inches in length, reaching completely through all its coats. The edges were clean-cut, and there was no evidence, even on microscopic examination, of pre-existing ulceration or degeneration. The wound opened into a cavity in the right side of the posterior mediastinum, extending between the gullet and the trachea in all directions, and also partly behind the former. This space might have contained a small lemon, and was crossed by fibrous trabeculæ, the intervals between them being filled with clotted blood. The walls of the cavity were of greenish hue, and the vagus nerve could be seen behind, thickened and red. The internal surface of the gullet, from the tracheal bifurcation down to the cardiac orifice of the stomach, was greenish in colour, the epithelial layer was flocculent, and here and there somewhat thickened, but it was entirely wanting over a space about an inch in diameter below the rent. The œsophageal walls were of normal consistence. The stomach showed the usual appearance of chronic catarrhal gastritis; there was no trace of *post-mortem* softening. Some black grumous material, probably altered blood, was found in the intestines, the spleen was enlarged and softened; there was "cloudy swelling" of both kidneys, and fatty infiltration of the liver. The heart presented signs of fatty degeneration.

TABLE OF CASES OF RUPTURE OF THE GULLET.

Author.	Sex.	Age.	Drinker.	Nature of rent.	Surgical emphysema.	Duration of life after accident.	Remarks
1. Boerhaave.	M.	50	?	Transverse in direction, tearing gullet quite asunder 2 in. above the diaphragm — opening into left pleural cavity.	Emphysema over front and sides of chest, and in the posterior mediastinum.	18½ hours.	Patient was a great eater, and suffered much from gout. He had been addicted to the free use of emetics.
2. Dryden.	M.	?	Yes.	Longitudinal rupture just above the diaphragm sufficient to admit fore and middle fingers—*probably* on the left side.	Emphysema "all round neck and throat."	From "in the morning after breakfast" till 10 p.m.	Patient avoided emetics as he always felt weak and sore after the strain of retching. He had taken warm water just before the rupture.
3. Wilkinson King.	M.	21	Yes.	"Large rent" where the œsophagus passes through the diaphragm.	Emphysema of the face and throat.	14 hours.	There was *post-mortem* solution of the cardiac end of the stomach.

4. Williams.	M.	?	?	Longitudinal rent close above the lower end of the gullet on the left side, $1\frac{3}{4}$ inches in length, opening into left pleura.	Not stated.	13 hours.	Diaphragm also ruptured.
5. Meyer.	M.	38	Yes.	Longitudinal rent, $1\frac{1}{4}$ in. long, 3 in. above the cardia.	Emphysema of side of face, neck, and front of chest.	50 hours.	Gullet was narrowed at lower part ; patient had swallowed soap-lees. Large cavity separating the gullet from the surrounding parts for $5\frac{1}{2}$ in. upwards from cardia.
6. Grammatzki.	M.	35	Probably.	Longitudinal rent, 5 centimetres long, running into the stomach.	Emphysema of face, neck, and chest, also of anterior and posterior mediastinum. Double pneumothorax.	From "morning" till 6.30 p.m.	Cavity large enough to hold a walnut just above cardia. Rent in cardia itself reaching to "submucosa."
7. Griffin.	M.	49	Innkeeper, but personal habits not stated.	Longitudinal rent, 1 inch in length, running upwards from just above the diaphragm — opening into left pleura.	Emphysema above both clavicles.	17 hours.	Patient had had two solid meals at a rather brief interval.

TABLE OF CASES OF RUPTURE OF THE GULLET.—*Continued.*

Author.	Sex.	Age.	Drinker.	Nature of rent.	Surgical emphysema.	Duration of life after accident.	Remarks.
8. Charles.	M.	35	Yes.	Longitudinal rent, 1½ in. long from below cardia, on left side, opening into left pleura.	Not stated.	7½ hours.	Cavity in posterior mediastinum full of grumous material. *Post-mortem* digestion of stomach.
9. Bailey.	M.	22	?	Longitudinal rent, ¾ in. long, from 1 in. above cardiac orifice.	Not stated.	24 hours.	Patient was a negro and remarkably robust.
10. Fitz.	M.	31	Yes.	Longitudinal rent, 2 in. long, in front and somewhat to the right, downwards from level of bifurcation of trachea.	Emphysema almost all over the body.	180 hours (7½ days).	Cavity of size of small lemon on right side of posterior mediastinum, between gullet and windpipe, also behind gullet.
11. Adams.	M.	53	?	Longitudinal rent in posterior wall of gullet. 1½ in. long upwards from diaphragm, opening into left pleura.	Not stated.	7 hours.	Old cicatrices in œsophageal wall close to rupture. The same in stomach. Patient had long been dyspeptic.

12. Heyfelder.	M.	?	Yes.	Irregular rent, of size of threepenny-piece, close to cardia.	Not stated.	?	
13. Taendler.	M.	17	No.	Longitudinal rent, ½ cent. long.	Emphysema over left half of thorax.	4 hours.	Patient was suffering from pyæmia.

WOUNDS OF THE GULLET.[1]

Latin Eq.—Vulnera œsophagi.
French Eq.—Plaies de l'œsophage.
German Eq.—Wunden der Speiseröhre.
Italian Eq.—Ferite del esofago.

DEFINITION.—*Wounds of the œsophagus of an incised, punctured, or contused character, caused by sharp bodies penetrating the walls of the tube either from within or from without, always giving rise to dysphagia.*

History.—Wounds of the œsophagus have hitherto attracted comparatively little notice, owing to the fact that this organ is seldom injured alone. Its deep situation, indeed, protects it to a very great extent from external wounds. When the gullet is wounded the windpipe and the large vessels of the neck are generally implicated in the injury, and from the urgency of the immediate symptoms they absorb the attention of the surgeon.

Ambroise Paré[2] appears to have been familiar with wounds of the gullet, and he directs that they should be treated with sutures when possible to apply them. He placed on record[3] an extraordinary case in which the windpipe and gullet were both completely divided. Paré succeeded in uniting the divided trachea sufficiently to allow of the patient recovering the power of speech so far as to be able to name his assailant, but all his efforts to bring the retracted ends of the œsophagus together in the same way failed, and death took place on the fourth day.

Isolated cases were reported by Larrey,[4] Boyer,[5] and Dupuytren,[6] but the subject was first systematically treated by Horteloup.[7] More recently several additional cases have been brought together by Durham[8] and Knott.[9]

---

[1] Extensive wounds in which the gullet is only one of several important structures involved will be considered in a separate article under the head of "Cut-throat."

[2] See the chapter, "Des Plaies de l'Œsophague."—Œuvres (Malgaigne's edition, Paris, 1840), vol. ii. p. 90.

[3] Œuvres, liv. x. ch. 31.

[4] "Clinique Chirurgicale." Paris, 1829. t. ii. p. 158.

[5] "Traité des Maladies Chirurgicales," t. vii. p. 279.

[6] "Blessures par Armes de Guerre," t. ii. p. 334.

[7] "Plaies du Larynx, de la Trachée, &c." Paris, 1869.

[8] "Holmes's System of Surgery." London, 1870, 2nd ed. vol. ii. pp. 445 and 457.

[9] "Pathology of the Œsophagus." Dublin, 1878. pp. 151-154.

Etiology.—Wounds produced by the perforation of small sharp substances that have been swallowed will be referred to under "Foreign Bodies," and it therefore only remains to consider wounds arising from the introduction of cutting weapons, such as swords and foils, and those caused by external injury. Accidents belonging to the former category are extremely rare, but a case is recorded by Levillain,[1] in which an officer whilst fencing received a wound from a foil as he was stooping. The point of the foil entered his mouth, lacerating the soft palate, and ran through the posterior wall of the œsophagus at the level of the fourth or fifth dorsal vertebra. A remarkable accident was related by Dr. Parkes[1] in which a sword-swallower pushed his weapon through the anterior wall of his gullet five and a half inches below the pharynx. The pericardium was pierced, most acute inflammation of the membrane ensued within an hour, and the patient died on the second day. No other injury was found after death. A peculiar feature in this case is that whilst one of the immediate symptoms caused by the wound was violent vomiting, the matters thrown up consisted solely of the contents of the stomach without a drop of blood. An extraordinary case was reported by Guise,[2] of Charenton, in which a lunatic thrust the handle of a fire-shovel into his throat with such force that it tore through the gullet, and fractured the fourth rib at the costo-vertebral ligament.

---

[1] "Journ. Univ. de Méd." 1820, p. 238.

In illustration of injury from without there are several examples. Boyer[3] has described the case of a young man, who received a bayonet-thrust at the anterior and upper part of the chest, causing a wound four lines from the sternum between the third and fourth ribs, from which there was a violent escape of air. Three days later food and drink appeared through the wound, but the patient ultimately recovered. Larrey[4] has reported an example of this accident which proved fatal. The patient, who had received a sword-thrust at the upper part of the chest, between the first and second ribs, at first improved under treatment, but was ultimately suffocated in trying to swallow some large pieces of bread. In another instance,[5] the patient, having received a wound between the fifth and sixth ribs, died at the end of thirty-six hours, all fluids that were drunk passing through the wound. There is also a case on record[6] in which a soldier was wounded by a bullet which traversed the œsophagus at its upper part. Drink passed through the wound, but the patient ultimately made a good recovery.

---

[1] "Trans. Path. Soc." London, 1848-9, p. 40.

[2] Quoted by Horteloup: Op. cit. p. 24.

[3] "Traité des Maladies Chirurgicales," t. vii. p. 279.

[4] "Clinique Chirurgicale." Paris, 1829, t. ii. p. 158.

[5] M. C. Etienne: "Consid. génér. sur les causes qui gênent ou empêchent la déglutition." Thèse de Paris, 1806, p. 8.

[6] Horteloup: Op. cit. p. 61.

In Dupuytren's[1] case, the patient, a woman, was stabbed just above the clavicle on the left side. She died on the seventh day, the fact that the gullet was wounded not having been recognized during life.

Symptoms.—The characteristic symptom of wounds in the œsophagus is the escape of food from the opening. It must not be forgotten, however, that when the trachea or larynx is injured from without, and especially if the pneumogastric or superior laryngeal nerve has been divided, the food may pass into the windpipe, and, as in wounds of the gullet, may come out through an opening in the neck. In most of the reported cases, violent hiccough and intense thirst have been present. There is often difficulty in breathing, but this appears to be due to complications arising from injury of the lungs or trachea.

Diagnosis.—The history of the case, taken in connection with the objective signs, generally renders the diagnosis easy. It is only in rare instances, such as that of Dupuytren, where a wound was inflicted on the œsophagus through the neck, and fluids subsequently swallowed did *not* escape, that the nature of the accident is likely to be overlooked. Possibly some cases of this kind occur which are never suspected, for, as Horteloup[2] points out, stabs with a knife or dagger as a rule cause only minute punctured wounds.

Prognosis.—For many years it was supposed that complete transverse division of this tube always proved fatal, and this was strongly supported by the experiments of Jobert.[3] This view, however, has been proved to be fallacious. When the wound is in the cervical portion of the gullet, and is limited to that organ, the case almost invariably does well; but of course, if the air-passages are injured at the same time, the prognosis is much more serious. Wounds in the thoracic portion are extremely fatal.

Treatment.—If the wound be large the edges should, if possible, be stitched together. The patient should be entirely fed by nutrient enemata (Vol. i. p. 580). If, however, this mode of administering nutriment does not seem sufficient to sustain the patient, he should be fed by the œsophageal feeding tube (Vol. ii. Fig. 11, p. 24) passed an inch or two beyond the wound; and if there be any difficulty in carrying out this treatment, an anæsthetic should be administered each time that the patient is fed. In some cases, however, owing

---

[1] Loc. cit.

[2] Op. cit. p. 19.

[3] Boulin: "Plaies de l'Œsophage." Thèse de Paris. 1828. p. 20.

to the irritation caused by the passage of the instrument, or to the impossibility of striking the orifice of the lower segment of the œsophagus when it has been completely cut across, it may be necessary to allow the patient to swallow bland liquids. Although, under these circumstances, most of the food will escape by the wound, a small quantity will trickle down the gullet. "When the necessities of nature require nourishment to be taken by the mouth," as Heister[1] remarks, the wound should constantly be diligently cleaned afterwards, lest any part of what was taken should stick by the way and putrefy, which would bring on very bad symptoms." It is only when there does not appear to be the slightest chance of the wound healing that the patient should be nourished by means of an instrument passed through the neck.

As a rule, a very nutritious and stimulating diet is necessary, and, in most cases, anodynes are required.

---

[1] "General System of Surgery." English Transl. 1743, vol. i. p. 77.

FOREIGN BODIES IN THE GULLET.

Latin Eq. Corpora adventitia in œsophago.
French Eq.—Corps étrangers dans l'œsophage.
German Eq.—Fremde Körper in der Speiseröhre.
Italian Eq.—Corpi stranieri nel esofago.

Definition.—*Foreign bodies lodged in the gullet, most commonly gaining access to that canal by the mouth, but occasionally passing up from the stomach, and more rarely still entering through the neck, giving rise to dysphagia, sometimes to dyspnœa, and often causing death.*

History.—The literature relating to the impaction of foreign bodies may be said to begin with the elaborate memoir on the subject presented by Hévin[1] in the middle of last century to the French Academy of Surgery. In this essay the author collected nearly all the instances of this accident scattered throughout the medical records of former times, and discussed the best methods of dealing with such cases. His work remains to this day the most complete account of foreign substances lodged in the œsophagus, and subsequent writers have added little to it, except descriptions of more convenient instruments for exploration of the canal and the extraction of bodies impacted in it. Bordenave[2] soon afterwards published a short memoir on "Foreign Bodies in the Gullet," and a work by Eckhold[3] on the same subject appeared in 1799, in which the instrument now known as Grafe's coin-catcher is described and figured. This author, however, does not claim to have invented it, but says that he had first seen it used in London. In 1830 Mondière[1] devoted one of his papers on the œsophagus to foreign bodies in that canal. Several years later essays were written by Simon,[2] Haken,[3] Bournéria,[4] Pawlikowski,[5] and Gebser,[6] and in 1867 Adelmann[7] published a collection of 314 cases of foreign bodies in the gullet and pharynx.[8] In 1868 a thesis on "Foreign Bodies in the Gullet" was written by Martin,[9] and in 1876 von Langenbeck[10] published the mature results of a very large experience of such accidents. In 1879 Nevot[11] brought together several interesting cases in which foreign bodies had perforated the gullet and laid open neighbouring blood-vessels.

---

[1] "Mémoires de l'Académie R. de Chir." 1761, vol. i. p. 444, et seq.
[2] "Thesis de corporibus extraneis intra œsophagum latentibus." Parisiis, 1763.
[3] "Ueber das ausziehen fremder Korper aus dem Speisekanal." Leipzig, 1799.

---

[1] "Arch. Gén.", 1830, 1re série, t. xxiv. p. 388, et seq.

[2] "Des Corps Étrangers dans l'Œsophage." Strasbourg, 1858.

[3] "De corporibus alienis œsophago illatis.", Dorpati Livonorum, 1859.

[4] "Des Accidents produits par les Corps Étrangers arrétés dans l'Œsophage. Strasbourg, 1860.

[5] "De corporibus alienis in œsophago." Vratislaviæ, 1860.

[6] "Ueber fremde Körper im Œsophagus und Pharynx." Leipzig, 1865.

[7] "Prager Vierteljahrschrift f. prakt. Heilkunde." vol. xcvi. p. 66. et seq.

[8] This unfortunate mingling of cases diminishes the value of the paper. General conclusions drawn from such statistics are fallacious, inasmuch as the impaction of foreign bodies in the pharynx is *ceteris paribus* far less dangerous than when they are lodged in the gullet.

[9] "Des Corps Étrangers de l'Œsophage." Thèse de Paris, 1868. No. 117.

[10] "Berlin klin. Wochenschr." Dec. 17 and 24. 1876.,

[11] "Perforation des Gros Vaisseaux par les Corps Étrangers de l'Œsophage. Thèse de Paris, 1879, No. 81.

Etiology.—The most common cause of accidents of this kind, is the lodgment in the gullet of substances such as fragments of bone, gristle, fruit-stones, or even pieces of wood swallowed with the food, or the impaction of large unmasticated morsels in hurried or gluttonous eating.[1] Such foreign bodies as pins and needles,[2] knives,[3] forks,[4] spoons,[5] buckles,[6] rings,[7] keys,[8] coins, singly or in *rouleaux*.[9]

---

[1] See Paré, Le Dran, Fabricius Hildanus, Wierus, Rhodius, Houillier, all in Hévin, loc. cit. pp. 446, 447, 448, and 455.

[2] See particularly "Lond. Med. Gazette," February, 1844, where a case is related by Bell in which death resulted from perforation of the right common carotid, and Schmidt's "Jahrbuch." vol. xxxix. p. 334, where an instance is recorded in which death occurred from gastritis more than two years after the foreign bodies had been swallowed.

[3] Hévin : Loc. cit. pp. 471, 515, and 595.

[4] Ibid. p. 518. Hénocque : "Gazette Hebdom." 1874, p. 229.

[5] Fournier : "Dict. des Sciences Méd."—Art. "Cas rares." Baratlio : "Progrès Médical." 1876, p. 70.

[6] Harrison : Dublin Journal of Med. Sci." vol. viii. Fournier : Loc. cit.

[7] Hévin : Loc. cit. p. 449.

[8] "Edinburgh Med. and Surg. Journ." 1843, vol. lx. p. 195. The French poet Gilbert died in the Hôtel-Dieu in 1780, having swallowed the key of his room five weeks before, whilst delirious from the effect of an injury to his head.

[9] Hévin : Loc. cit. pp. 449, 452, 455, 459. Gay : "Boston Med. and Surg. Journ." 1879, p. 356. Mignot : "Gazette Hebd." Oct. 30, 1874.

seals,[1] beads,[2] nails,[3] and stones[4] have found their way into the œsophagus by accident, or have been deliberately swallowed by insane people, or out of mere bravado by persons considered sane. Sometimes jewels or money have also been swallowed for the purpose of concealment. An extraordinary instance is on record[5] of a blacksmith who was killed by a fragment of a red-hot key which he was in the act of forging. The key broke, and a bit of the metal flew down the man's throat and lodged in his gullet. False teeth and palate-obturators have sometimes slipped down into the gullet, and this mischance is especially likely to happen during sleep or unconsciousness, if such objects are not removed from the mouth. A curious case has been reported by von Langenbeck,[6] in which a woman who had suffered from syphilis was for some time in a critical condition from the greater part of the bony framework of her nose having become detached by necrosis, and fallen into her gullet while she was asleep. Many accidents have occurred from the well-known propensity of infants to put into their mouths anything which they can lay their hands on. Older children have sometimes swallowed playthings which they have had in their mouths on going to sleep. There are also cases on record in which children have introduced most dangerous foreign bodies into other peoples' throats. In two instances of this nature, fish-hooks have been fixed in the œsophagus, apparently through a precocious love of sport. In one case,[7] a little boy, finding his mother asleep with her mouth open, ingeniously introduced a fish-hook attached to a line. The mother suddenly awaking, involuntarily swallowed the hook, which, after passing several inches down, penetrated the walls of the gullet. In another case,[8] a boatman's children, aged five and four years respectively, agreed to "play at fishing," the elder persuading the younger to take the part of "fish." The hook was baited with a tempting morsel, and the younger boy, having played round it for some time after the manner of fishes, seized it with his mouth and swallowed it. The youthful angler at once dexterously jerked the line, and hooked the "fish" near the lower end of the gullet. In both these remarkable cases, the hooks were removed by an ingenious device to be presently described.

---

[1] Billroth : "Archiv. f. klin. Chir." 1872, vol. xiii.

[2] Monti : "Jahrb. f. Kinderheilk." 1875, vol. ix.

[3] Harrison : "Dublin Journ. of Med. Sci." vol. viii. Hévin : Loc. cit. p. 471.

[4] Castresana : "España Medica," Aug. 18, 1859. Holner : "Med. Times and Gaz." Jan. 13, 1883, p. 47.

[5] Bierfreund : "Med. Zeitung Russl." 46, 1848.

[6] "Memorabilien Jahrg." Bd. xxii. Heft 1.

[7] Leroy : "Revue Méd.-Chir. de Paris." 1847, t. ii. p. 110.

[8] Baud : Ibid. 1848, t. iii. p. 44.

There are several instances in which ears of rye are stated[1] to have been taken into the œsophagus with serious and even fatal results, but a careful study of these cases shows that in nearly all of them the foreign body had really been drawn into the trachea, and not into the gullet.

Frogs,[2] small live fish,[3] eels,[4] and even snakes[5] have in various manners found their way into the œsophagus, and there are a considerable number of cases in which severe symptoms have been caused by the presence of a leech[6] in the gullet. All the recorded examples of the latter accident have occurred in soldiers, which is accounted for by the fact that during campaigns, brackish water has often to be hurriedly drunk out of wayside pools.

Undigested substances thrown up from the stomach have not unfrequently become impacted in the gullet.[7] Parasitic worms have been vomited through the mouth after having caused obstruction of the œsophagus.[8]

One of the most complicated cases of foreign body in the gullet is related by Adelmann,[9] in which a man swallowed a piece of mutton with some of the bone. Attempts at extraction with forceps, and at propulsion with the sponge-probang, having failed, Gräfe's coin-catcher was tried. This instrument was passed below the foreign body, but became so tightly wedged in that it could not be withdrawn. The unfortunate patient remained with this additional foreign body in his gullet for more than two days. The coin-catcher was finally loosened by means of a gum-elastic catheter, which was threaded over it, and when the impacted instrument had been got out, the original foreign body was pushed into the stomach. The patient succumbed about a fortnight after the first accident, but it does not seem that the fatal result was in any way caused or accelerated by the surgical mishap. A similar accident occurred quite recently to Dr. Holmer, of Copenhagen, whilst attempting to pull out a stone impacted in the gullet of a lunatic who had swallowed it with suicidal purpose. External œsophagotomy was at once performed, and both the foreign bodies were removed, the patient making a good recovery. The stone was five centimetres long, and five broad at its widest part.[1]

---

[1] Hévin : Loc. cit. p. 553. Desgranges : "Journ. de Médecine." t. xxxviii. No. 1359.

[2] "Allgem. Repert." 1838, ix. p. 109.

[3] "Union Médicale." 1863, p. 568. "Archiv. f. klin. Chir." 8, p. 481. Norman Chevers : "Manual of Med. Jurispr." Calcutta, 1870, p. 619.

[4] "Allgem. Repert." 1838, xi. p. 90.

[5] Ibid. 1838, xi. p. 89.

[6] "Journ. Univ. des Sciences Médicales." January, 1828. Baizeau : "Gazette Médicale de Paris." 1863.

[7] Hévin : Loc. cit. p. 455. Boulard : "Archives Gén." t. xxiii. p. 528.

[8] Laprade : "Compte rendu des Travaux de la Société de Médecine de Lyon." 1821, p. 62. Méplain : "Journ. Complém." t. xvii. p. 372.

[9] Loc. cit. p. 66, et seq.

Symptoms.—Foreign bodies which are at all large are especially liable to be arrested either at the upper orifice of the œsophagus, or at the middle third where the left bronchus crosses the gullet. Small sharp bodies, such as pins and fish-bones, may stick into the œsophageal wall at any level. The symptoms depend mainly on the consistence, dimensions, and form of the foreign body. Thus, bodies of soft structure, such as pieces of food, even when large, though temporarily obstructing the œsophagus, generally soon become sufficiently macerated to pass downwards. *Large hard bodies* give rise to the most urgent symptoms, such as extreme dysphagia, intense dyspnœa, acute pain, and profound oppression and anxiety. If, as is commonly the case, such a body becomes lodged in the cervical part of the gullet, it may give rise to a swelling in the neck. If the body be not large enough to cause immediate danger, the inflammation which is set up causes considerable fever, and the patient usually wastes rapidly. *Small hard bodies*, if rough or angular, generally give rise to slight dysphagia and a constant feeling of irritation. In some cases, however, there is rather severe spasm of the gullet, so that great difficulty in swallowing is experienced. In other instances, the symptoms, though slight at the time, may ultimately become serious. The following is a case[2] of this kind:—A girl, whilst eating some soup, accidentally swallowed a fragment of bone. The first symptoms soon passed off, but after a time her voice became reduced to a whisper. She became feverish, lost flesh, and had a troublesome cough with thick blood-stained expectoration. At the end of fourteen years, this patient was seen by

---

[1] "Med. Times and Gazette," Jan. 13, 1883.

[2] "Journ. de la Soc. de Méd. de Paris," t. xxiv. p. 13.

Gauthier de Claubry, who at first believed her to be in the last stage of phthisis. On pressing her neck, however, he found marked tenderness above the left clavicle. This examination caused an inclination to vomit, and the patient brought up the piece of bone, feeling at the same time a "tearing" pain in the neck. Her health was subsequently completely restored.

Sometimes, however, foreign bodies produce very little irritation, and I may remark that I know of an instance where a halfpenny was retained in the œsophagus for many years without giving rise to much inconvenience. From the symptoms it appeared that the coin was pressed laterally against the sides of the œsophagus, in which position it was probably retained by bands of fibrous tissue. A still more remarkable case has been reported by Larrey[1] in which a five-franc piece became impacted in a man's gullet. Propulsion was tried and was thought, both by the surgeon and the patient, to have been successful. The patient, however, suffered afterwards from convulsions, and died two months later from meningitis. After death the coin was found fixed perpendicularly about an inch above the cardiac orifice, the rim pressing on the wall of the gullet on each side. The coats of the tube were much thickened at this part, and the pneumogastric nerves were stretched over the edges of the coin. There was spindle-shaped swelling with great redness of both nervous cords, especially of the right one. It is remarkable, however, that the mucous membrane presented scarcely any trace of inflammation.

Analysing the symptoms in greater detail, the dysphagia, as already indicated, varies to a considerable extent, being sometimes so extreme that even the saliva cannot be swallowed, whilst in other instances, solids can be taken without much pain. Dyspnœa likewise may be either present or absent, its occurrence being generally due to the large size or angular form of the foreign body. In the former case the interference with respiration may result from direct pressure on the back of the trachea, in the latter from reflex spasm of the glottis. If the dyspnœa be intermittent, it may be inferred that it is of reflex origin. The oppression and anxiety which are caused by the presence of a foreign body in the gullet are characteristic of nearly all acute affections of the œsophagus, and they are sometimes accompanied by cold sweats and syncope. The voice is often greatly modified, and sometimes altogether extinguished. The pain is sometimes described as being of a "bursting" character, and frequently gives rise to straining and unsuccessful efforts at vomiting. In some cases convulsions and even lockjaw[1] have followed the impaction of a foreign body in the gullet. These various symptoms often abate for a few hours, to come on again with additional violence. On the other hand, small smooth foreign bodies may be occasionally lodged in the œsophagus for a considerable time without giving rise to any active symptoms, and it is only when inflammation is set up that they attract attention.

---

[1] "Clinique Chirurgicale." Paris, 1829, t. ii. p. 165.

The exact position of a foreign body can often be ascertained by physical exploration. Sometimes it may be possible to use the œsophagoscope, and when this instrument is employed to detect an impacted body, it is better to administer an anæsthetic. In other cases useful information may be obtained by means of the bougie. The sensation caused by the contact of a foreign body with the instrument may be greatly intensified by using Duplay's resonator (Vol. ii. Fig. 5, p. 18). By auscultation of the œsophagus in the ordinary way during the act of deglutition, fluid may be heard to strike against the foreign body, whilst below this point there is either no distinct sound, or only a slight trickling noise can be perceived.

If the foreign body be allowed to remain and the patient survive, a variety of secondary symptoms may arise. In many cases inflammation is set up, and the tissues imprisoning the foreign substance being destroyed by ulceration, it is set free and may be vomited up, or may fall into the stomach. Whether the offending body be extruded or not, however, perforation of the œsophagus is a frequent consequence of the accident. Sometimes extensive ulceration takes place in the areolar tissue surrounding the gullet, and a large cavity is formed in the mediastinum. Occasionally the ulceration may extend to the trachea, bronchi, or pericardium, giving rise to acute inflammation of any of these organs. In a case reported by Walshe,[2] the point of a knife had perforated the pericardium and set up pericarditis; and, in a somewhat similar instance,[3] the entrance of air and particles of food into the pericardial sac through the wound in the gullet, had caused the pericardial inflammation to be of a purulent character. Occasionally vessels are laid open, and death ensues from hæmorrhage. A circumscribed abscess is sometimes formed, and this may point in the neck. Two cases[1] are on record in which the temporary impaction of a foreign body led to rupture of the œsophagus. In one instance[2] a fish-bone, perforating the gullet in the neighbourhood of the heart, pierced the pericardium and fixed itself in the middle of the septum after wounding the right coronary vein. When the foreign body penetrates by ulceration into one of the pleural cavities, it generally soon gives rise to empyema, and the offending substance has sometimes been removed by paracentesis. In a case which I saw some years ago with Dr. Turtle, of Woodford, a very careful examination failed to discover a fish-bone which had accidentally found its way into an infant's throat. The baby gradually wasted away, and when it died, at the end of some months, it was found that the fish-bone had passed through the intervertebral substance and wounded the cord. In some instances the foreign body reaches the stomach, or it may pass into the intestines, and cause fatal ulceration in any part of its course; or perforating into the areolar tissue of the groin or lumbar region, it may give rise to an artificial anus. If, however, the body be small and smooth, it will often pass through the whole intestinal tract, and be got rid of *per rectum* without doing any harm.

---

[1] Godinet: "Annales de Montpellier," t. iii. p. 230.

[2] "Diseases of the Heart and Great Vessels." 1873, 4th ed. pp. 42 and 273.

[3] Ibid. p. 218.

Pathology.—Any of the various pathological conditions which have been referred to under the head of "Symptoms," such as inflammation, abscess, gangrene, or perforation involving either the œsophagus alone, the surrounding areolar tissue, or any of the adjoining organs, may be present. Abscesses are especially likely to be formed even a considerable length of time subsequent to the impaction of the foreign body. The interval in Adelmann's[3] cases ranged from a week to fifteen months. In the same series,[4] perforation of the aorta occurred fourteen times, and of the common carotid six times, whilst the right subclavian and the pulmonary artery were each wounded once.

Diagnosis.—In most cases this is easily arrived at from the history, and, as a rule, it is only when the patients are insane persons or children that any doubt can arise. Under such circumstances the sudden establishment of dysphagia will lead to an examination of the œsophagus, and one of the methods of exploration already described will, in most cases, clear up all doubts. The following example will show the advantage of œsophagoscopy in facilitating the detection and removal of foreign bodies that might otherwise baffle the practitioner's efforts :—

---

[1] Meyer: "Canstatt's Jahresb." 1858, vol. iii. p. 334. Allen: "Amer. Journ. Med. Sci." January, 1877, p. 17.

[2] Andrew: "Lancet," 1860, p. 186.

[3] Loc. cit. p. 99.

[4] Loc. cit. p. 103.

Mrs. B., aged fifty-one, was sent to me by Dr. Spitta, of Clapham, in February, 1881. She complained of great difficulty of swallowing and a feeling of something sticking in her throat. The symptoms had commenced suddenly whilst she was taking a meal, a fortnight previously. At the first examination with the œsophagoscope, the interior of the gullet was seen to be highly inflamed, but no foreign body could be perceived. At a second sitting, however, a few days later, a flat lamella of bone, about four millimetres square, was detected on the anterior wall of the œsophagus, about two inches below the cricoid cartilage. The bone, together with a small piece of decayed meat, which was adherent to it, was easily removed with forceps. Mrs. B. felt some slight inconvenience for three or four weeks after the foreign body had been taken out, but when last seen she was able to swallow without any difficulty.

Prognosis.—This depends, in the first place, on whether the foreign body is removed or remains fixed in the œsophagus. In the latter case, if the substance be of any considerable size, the prospects of the patient are extremely unfavourable.

Even if the foreign body be quickly ejected, however, inflammation may have been set up which may subsequently give rise to very dangerous complications. Further, when the body has remained long enough *in situ* to cause sloughing, it must not be forgotten that, though relief may be obtained for a time by the expulsion of the offending substance, the patient's life may be brought into jeopardy in the progress of subsequent cicatrization.

Treatment.—In all cases an attempt should be made, in the first instance, to withdraw the foreign body from above *per vias naturales.* This may be accomplished either with the parasol-probang, with Gräfe's coin-catcher, or with forceps. The first-mentioned instrument is by far the most serviceable for small bodies ; Gräfe's snare answers well when a coin is lodged in the gullet ; whilst the use of forceps is indicated where the body is large and firmly imbedded. The reader is referred to the description of these instruments and the mode of using them already given (Vol. ii. pp. 19, 20). Where instrumental treatment has to be adopted, it is often very desirable to administer an anæsthetic. This is especially the case if the foreign body be large, if there be much spasm, or if the patient be nervous or of tender years. Exceptional bodies require exceptional instruments for their removal. In the cases where fish-hooks were swallowed,[1] they were both removed by a very similar procedure, which suggested itself quite independently to two different surgeons, Baud and Leroy, both practising in the Low Countries. Baud did not record his case, which appears to have occurred some time previously to that of Leroy, until the latter surgeon had published an almost identical example of the accident. The mode in which the fish-hooks reached the gullet has already been described under the head of "Etiology." In both instances a leaden bullet pierced through the centre was threaded along the fishing line, and allowed to fall by its own weight down the œsophagus till it reached the hook. The further descent of the bullet dragged the hook downwards, and thus disengaged it, and its barb having come in contact with the lead, both were drawn up together. Baud employed a ball which had a diameter double that of the hook, whilst Leroy used a smaller bullet, with a hollow reed attached—an arrangement which he considers assisted in disengaging the hook from the flesh. On the whole, however, Baud's method appears the more simple and efficacious. In another case, reported quite recently by Laurent,[2] a fish-hook was removed from the gullet of a boy who had accidentally swallowed it, by the following plan :—A full-sized hollow œsophageal bougie was threaded along the line attached to the hook till it reached the bend of the latter. Gentle pressure with the instrument set the hook free, when the line was tightened, and the bougie withdrawn together with the foreign body.

Formerly emetics were often administered, with the view of effecting the expulsion of foreign bodies, and this measure has often proved successful. I do not recommend this treatment, but there are occasions when it may be desirable to try it. As the patient is unable to swallow, the best mode of producing vomiting is by the subcutaneous injection of hydrochlorate of apomorphia, $\frac{1}{25}$th to $\frac{1}{10}$th of a grain. One grain may be dissolved in 50 minims of distilled water, but as the solution is very unstable it should always be freshly prepared for hypodermic use. Enemata of tobacco have also been used for the same purpose, and, in some instances, with success. In a few cases, intravenous injection of tartar emetic has proved effectual, but this is a dangerous plan. Treatment by emetics has sometimes been attended with success, even in cases where the foreign body has remained in the gullet for a considerable period, but, as a general rule, it cannot be relied upon. Other plans have occasionally been tried. Thus, an instance[1] is on record in which a large soft substance was thought to have been digested in the gullet by the administration of pepsine sixty-eight hours after the accident. Inversion, as already described in detail (Vol. i. p. 570), may be useful when the body to be dislodged is smooth and heavy. The first recorded instance[2] of inversion for the extraction of a foreign body impacted in the gullet, which I have been able to find, is in the case of a patient who had swallowed a knife. At his own suggestion, he was several times hung up by the heels in the hope that the knife might fall out by its own weight. His persevering efforts were, however, unavailing, and the knife was removed by gastrotomy. In a case in which the patient was threatened with asphyxia through the impaction of several large pieces of potato in the œsophagus, Dupuytren[3] managed to pinch the gullet with his fingers through the neck, so as to crush the potato and thereby enable it to be swallowed. Langenbeck[4] was on two occasions able, by the same method, to alter the shape of a tough piece of meat sufficiently to allow the impacted morsel in one instance to descend into the stomach, and in the other to be removed through the mouth with forceps. In a case reported by Atherton,[5] the patient herself, an old woman, had attempted, and partly succeeded, in forcing an impacted bone downwards by external manipulation.

---

[1] Leroy : Loc. cit. Baud : Loc. cit.

[2] "Lancet." 1882, vol. ii. p. 745.

If it be found impossible to draw up the foreign body, it must either be left *in situ*, pushed into the stomach, or if situated in the cervical portion of the gullet, removed by œsophagotomy. If the patient is able to swallow liquids, it is better, when the foreign body cannot be removed, to leave it alone, in the hope that as soon as the spasm gives way, or the inflammation subsides, the substance may be vomited up. Sucking small particles of ice is sometimes of use in these cases. Large angular bodies, such as false teeth or pieces of bone, should be pushed into the stomach only as a last resource, and when they are impacted in the lower part of the œsophagus. Such bodies cannot remain long in that situation without causing death, and it is therefore better, under the circumstances, to thrust them down, even if some degree of force has to be employed. Propulsion may be most readily effected by means of the ordinary sponge-probang. Injection of water into the gullet and dilatation of the canal by means of an air-pessary passed down to the foreign body have also been used with success for the same purpose. In the former case the force is applied directly to the foreign body, whilst in the latter, where an india-rubber bag is inflated with air, the impacted body is probably set free by the forcible expansion of the œsophageal walls. If the body be inconsiderable in size, such as a fish-bone, or a small fragment of the bone of any animal, or even a coin, it is best, if a careful attempt at propulsion has failed, to leave the offending substance undisturbed, provided the patient can swallow sufficient nutriment.

---

[1] "Deutsche Klinik." 1861, p. 109.

[2] Hévin: Loc. cit. p. 595.

[3] Quoted by Luton: "Nouveau Dict. de Méd. et de Chir." Paris, 1877, t. xxiv. p. 356.

[4] Loc. cit.

[5] "Boston Med. and Surg. Journal." 1870.

Œsophagotomy is indicated in all cases where, the foreign body being situated in the cervical or the upper part of the dorsal region of the gullet, deglutition is impossible, or there is dangerous pressure on the trachea.

EXTERNAL ŒSOPHAGOTOMY.

History.—This operation appears to have been first suggested by Verduc[1] towards the end of the seventeenth century. About fifty years later Gnattani[2] read a paper before the Academy of Surgery of Paris, in which he strongly maintained the practicability of the operation, and gave an account of some experiments on the dead body made with the view of determining the best method of carrying it out, and of some vivisections on dogs undertaken to test the result of such a procedure. External œsophagotomy, however, had at that time been already carried out in actual practice, although the cases had not been published. One operation of the kind had been done for the removal of a foreign body; whilst another is merely mentioned without any detail.[3] In 1781 a thesis was sustained on the subject by Sue,[4] at Paris, in which he gave the results of some experiments on dogs which had been forced to swallow fragments of bone of such large size that they became impacted in the œsophagus.

---

[1] "Traité des Operations de Chirurgie." Amsterdam, 1739, t. ii. pp. 381, 382. (The original edition was published in Paris in 1693.)

[2] "Mém. de l'Acad. Royale de Chir." 1747, t. iii. p. 351.

[3] Both these cases are mentioned in the "Mém. de l'Acad. de Chirurgie." 1757, t. iii. p. 14.

[4] "Programma de Œsophagotomiâ." Paris, 1781.

A few years later Eckholdt[1] proposed to open the gullet between the heads of the sterno-mastoid, a plan which would enable the surgeon to reach the tube quite at the lower part of the neck. This difficult operation has never, I believe, been tried on the living subject. In 1820 Vacca Berlinghieri[2] published an essay, in which he advocated cutting into the œsophagus on a sound previously passed through the mouth as a guide. In 1832 a valuable paper on external œsophagotomy was written by Bégin,[3] who was the first to describe in detail all the steps necessary for opening the gullet with the least possible danger to the many important neighbouring structures. Since that time the operation has become a recognized surgical procedure. A full history of external œsophagotomy, with a detailed account of most of the cases recorded in medical literature, was published in 1870 by Terrier[4] in his valuable monograph on the subject.

---

[1] "Ueber das Ausziehen fremder Körper aus dem Speisecanal." Leipzig, 1799.

[2] "Della Esofagotomia." Pisa, 1820. The instrument has already been described in speaking of œsophagostomy (see Foot-note, p. 143), for which operation it is more useful than for the removal of a foreign body.

[3] Mém. de Med. de Chir. et de Pharm. Milit." 1832, t. xxxiii. p. 241.

[4] "De l'Œsophagotomie Externe." Paris, 1870.

It would appear from Terrier's[1] statistics that the success of the operation depends in great measure on its early performance, for out of six operations done before the sixth day only one death occurred, while of five cases where it was carried out from the eighth to the thirty-sixth day three proved fatal. The mode of performing the operation is as follows:—

External Œsophagotomy.—The preliminary steps of the operation are similar to those already described under the head of "Œsophagostomy" (see p. 142). The incision need not, however, be so long as is there recommended, but should be made so that the middle part of it shall correspond to the supposed point of impaction of the foreign body. A special difficulty is likely, according to von Langenbeck,[2] to be encountered in cases where a large foreign body has been impacted behind the cricoid cartilage for several days. Under these circumstances the thyroid body is exceedingly apt to be so much swollen by venous congestion as almost entirely to cover the gullet. To expose that tube, therefore, the thyroid must be carefully raised from it, and for this purpose the capsule of the gland must be incised. When the gullet has been laid bare the foreign body will in most cases be seen or felt projecting through the wall, which should be nicked with the knife, just sufficiently to permit the impacted substance to be drawn out with forceps. Should it, however, be too small to be felt, a bougie with a metallic or ivory knob should be passed into the gullet by the mouth, or Vacca Berlinghieri's sound may be used. Upon the extremity of one of these instruments an incision should be made in the œsophagus for about half an inch in the direction of the long axis of the tube, care being taken to open it as far back from the trachea as possible, in order to avoid wounding the recurrent nerve. The fact that the gullet has been opened will be rendered apparent by the escape of a considerable quantity of mucus from the wound. If the impacted substance has not already been discovered, it should now be searched for and removed. The edges of the œsophageal wound should afterwards be brought together with catgut sutures, the ends of which should be cut off short. If possible, the patient should receive nourishment only by enemata for the first week or ten days, but if this means of sustaining life prove inadequate, a gum-elastic tube must be passed down the gullet beyond the seat of the wound, and food administered through it.

---

[1] Op. cit. pp. 116, 117.

[2] Loc. cit.

[NEUROSES OF THE GULLET.]

PARALYSIS OF THE GULLET.

Latin Eq.—Imbecillitas gulæ.
French Eq.—Paralysie de l'œsophage.
German Eq.—Lähmung der Speiseröhre.
Italian Eq.—Paralisi del esofago.

DEFINITION.—*Loss of power of the muscular fibres of the œsophagus, causing food to lodge in the canal, or to be swallowed with difficulty.*

History.—Galen[1] was acquainted with this disease, which he referred to as "imbecillitas gulæ," carefully distinguishing between difficulty of swallowing from this cause, and that due to narrowing of the canal itself, or to the pressure of a tumour on its walls. The affection was mentioned by Ætius[2] in the sixth century, but the complaint was not generally recognized till after the middle of the seventeenth century, when our own celebrated physician, Willis,[3] published a remarkable case in which he had kept a patient alive for nearly twenty years by teaching him to push his food down with a sponge-probang. The subject was treated of by Stalpaert van der Wiel[1] in 1682, and by Spies[2] in 1727, whilst Hoffmann,[3] in 1734, described the case of a patient who was obliged to wash down every mouthful of food with water. Some years later van Swieten[4] gave a clear account of the affection, and in 1757 Wepfer[5] recorded several instances in which palsy of the gullet had followed an attack of apoplexy. The subject was discussed, with somewhat less than his usual thoroughness, by Morgagni,[6] and in the early part of the present century Monro[7] published many interesting examples of the complaint. Esquirol,[8] in 1829, described paralysis of the œsophagus as a condition somewhat frequently occurring in lunatics, and occasionally proving the direct cause of their death. In 1833 Mondière[9] treated the subject with his usual erudition, and since then the disease has been more or less fully described in nearly every text book of medicine.

---

[1] "De locis affectis," lib. ii. cap. v.
[2] "Tetrabiblos," ii. Sermo ii. c. 33.
[3] "Pharm. Rat." part i. sect. 2, cap. i. Oxonii. 1674.

---

[1] "Obs. med. rarior, centur. post." 1682, p. i. obs. xxvii.
[2] "De deglutitione læsâ." Helmsted, 1727.
[3] "Consult. et respons. cent." t. i. p. 304.
[4] "Comment. in H. Boerhaave Aphorismos." Lugd. Batav. 1745, t. ii. p. 701.
[5] "Historia Apoplect." Venetiis, 1757, p. 376.
[6] "De sedibus et causis morb." Ed. secunda, Patavii, 1765, epist. xxviii. art. 14.
[7] "Morbid Anatomy of the Human Gullet, &c." Edinburgh, 1811, p. 290, et seq.
[8] "Annales d'Hygiène Publique." 1829, No. 1, p. 141.
[9] "Archiv. Gén." 1833, t. iii.

Etiology.—The affection is met with under three forms viz., first, where it is due to *central* disease; secondly, where it results from *nerve-pressure;* and thirdly, where it arises from *muscular weakness.* It is obvious, however, that all these conditions, or any two of them, may coexist. As examples of central diseases giving rise to loss of power in the œsophagus may be mentioned hæmorrhage into the pons Varolii, or the medulla oblongata, or the development of a tumour in either of these situations, bulbar paralysis, multiple sclerosis, progressive locomotor ataxy, or cerebral atrophy as it occurs in general paralysis of the insane; in short, any condition affecting the "centre of deglutition" may be the cause of the paralytic phenomena. Wepfer[1] has recorded several cases in which the immediate cause of death in persons suffering from apoplexy was inability to swallow, and a very remarkable example of the central origin of œsophageal paralysis has been related by Flaudin[2] in which a patient suddenly lost the power of deglutition whilst at table, the seizure being followed within a few hours by facial paralysis. Larrey[3] published an interesting case in which a lance thrust through the posterior lobe of the left hemisphere of the brain was supposed to have penetrated to the fourth ventricle. The wounded man recovered with the loss of most of his special senses, and with complete paralysis of the pharynx and œsophagus. Esquirol[1] observes that palsy of the gullet is very common in the insane, and that in such patients asphyxia often results from food accumulated in the œsophagus pressing on the trachea. A case is related at the end of this article which well illustrates the effect of pressure by a small clot, probably in the vicinity of the fourth ventricle. Montaut[2] mentions an instance in which œsophageal paralysis was caused by a hydatid cyst at the base of the brain..

---

[1] Op. cit. p. 376.
[2] "Journ. Hebdom." 1831, No. 4.
[3] "Recueil de Mém. de Chir." 1821.

As regards peripheral lesions it is doubtful whether paralysis of one pneumogastric nerve would seriously interfere with the function of the gullet, and the conditions are very rare in which both nerves are diseased or pressed upon by diseased structures. As far as I am aware there are no illustrations in recent medical literature of œsophageal palsy resulting from nerve-pressure, but Köhler[3] relates an instance of paralysis in which tubercular infiltration of the bronchial lymphatic glands compressed the pneumogastric nerves, and Wilson[4] met with a case in which the nerves were injured by a syphilitic enlargement of the cervical vertebræ. The exostosis having disappeared under anti-venereal treatment, the power of swallowing was at once recovered.

In these various examples of central and peripheral paralysis, it must be borne in mind that the imperfect action of the muscular fibres of the œsophagus may be due either to a direct *derangement of the motor function* or to *impairment of the sensibility* of the mucous membrane, which accordingly fails to convey the necessary stimulus for reflex action. It is probable, however, that in most instances both the motor and sensory nuclei of the vagus are at fault.

In approaching dissolution the function of the nerve-centre controlling the act of deglutition is extinguished some time before circulation and respiration cease.

In simple weakness the disease is probably in great measure myopathic, but in some cases the muscles may become feeble from impaired innervation. This is the most common form of paralytic dysphagia, and it is met with in persons broken down by ill-health or old age; it is much more frequently found in men than in women.

---

[1] "Annales d'Hygiène Publique." 1829. No. 1, p. 141.

[2] Quoted by Mondière: "Arch. Gén." 2e série, t. iii. p. 43.

[3] Ibid. p. 42.

[4] Ibid. p. 46.

In addition to these special causes of paralysis of the œsophagus, there are certain general conditions of the system with which it is often associated, and in which it is hard to determine how far the affection is myopathic or neuropathic in origin. Thus in many of the acute fevers there is difficulty of swallowing, apparently from the imperfect action of the pharynx and œsophagus, but whether this depends on loss of sensibility, derangement of the motor apparatus, or diminishd excitability of the "centre of deglutition," it is not easy to tell. It is not improbable, indeed, that the dysphagia in these cases is sometimes mainly mechanical—that is to say, that it arises from mere dryness of the mucous membrane. In diphtheria the affection is generally a neurosis,[1] whilst syphilis may affect either the medulla, or the nerves in some part of their course. In palsy of the gullet arising from lead poisoning, of which I have met with two examples, the muscular structure is probably most implicated. This variety of poisoning is also said to have occurred through the use of lead gargles.[2]

Ollenroth[3] many years ago described a form of œsophageal paralysis which on three occasions he had observed in nurslings. The onset of the affection was in each case preceded by aphthous eruptions about the corners of the mouth and round the anus. This was followed by rigors and high fever, with vomiting and profuse alvine discharge of a milky-looking fluid without any smell. The whole pharyngo-œsophageal canal next appeared to be stricken with paralysis, and death quickly ensued from collapse. The post-mortem appearances were not recorded, and it is highly probable that these cases were not really examples of paralysis, but of thrush of the gullet (See Vol. ii. p. 64).

Though hysteria so frequently gives rise to paralysis of other muscles, it very seldom affects the œsophagus in this way, generally, on the contrary, causing spasm of the tube.

Symptoms.—In all cases of paralysis of the gullet the essential symptom is *dysphagia*, its sudden or gradual development, and the degree it attains being dependent on the fundamental cause of the malady. The difficulty of swallowing, though considerable, probably never reaches to the extent of complete aphagia, unless the pharynx is at the same time paralysed.

---

[1] See "Diphtheria, its Nature and Treatment." By the Author. London, 1879, pp. 56, 57.

[2] "Hufeland's Journal." 1797, Bd. iii. p. 698. It should be observed that in this case the paralysis was preceded by sharp spasm.

[3] "Schmidt's Jahrb." 1837, Bd. xvi. pp. 50—52.

As bilateral paralysis of the nerves is extremely rare, and would produce nearly the same œsophageal symptoms as cerebro-spinal disease, two divisions are sufficient for clinical purposes: these are central and local paralysis.

In *central* disease the mode of development depends on the special nature of the medullary lesion; thus in hæmorrhage, the symptom occurs suddenly, and at once attains its maximum intensity. In cases of cerebral tumour the dysphagia becomes gradually developed, whilst in bulbar paralysis, multiple sclerosis and locomotor ataxy, œsophageal palsy is a very rare symptom, and, if present, comes on, as a rule, only at an advanced stage of the disease. In general paralysis of the insane dysphagia is more common and occurs at an earlier period. In almost all cases of central origin signs of impaired innervation of the larynx, such as anæsthesia of the mucous membrane or paralysis of the abductor filaments of the recurrent nerve accompany the œsophageal symptoms. The patient is almost always feeble and depressed, but emaciation is not usually a marked symptom.

In *local* paralysis, the development of the dysphagia is very gradual. I have seen several instances in which the disease has lasted from ten to twenty years. It apparently leads, after a time, to some stenosis of the gullet, and in long-standing cases the *isthmus faucium*, and even the mouth, is often much contracted. In 1875 I had a patient under my care whose mouth had become so reduced in size that it only measured one inch and an eighth across, whilst the distance between the lips, when parted to the utmost extent, was no more than a quarter of an inch. This patient had suffered from dysphagia for sixteen years, and for the last five years had lived entirely on cornflour and tea, with a little beef-tea once a week. In this form of œsophageal paralysis, owing to the longer duration of life, emaciation is a much more marked symptom than when the loss of power is due to central disease.

In both varieties important information may be obtained by the employment of the bougie and by auscultation. Certain features are common to both kinds of nervous dysphagia. Thus a bougie can usually be passed easily, and the employment of the instrument does not give rise to so much nausea and retching, as in health. Occasionally, however, when the disease has existed for many years, the habitual use of liquids appears to lead to general narrowing of the canal, so that there may be considerable difficulty in passing an instrument. On auscultation the normal œsophageal sound is found to be greatly altered or altogether lost, and the act of deglutition is observed to be markedly prolonged. Hamburger points out that the "morsel" seems to lose its resemblance to the form of an inverted egg, and to assume the shape of a funnel, but I have never been able to verify this refinement of diagnosis. In extreme cases there is no longer any sound like that of a defined body of fluid passing downwards, and all that is heard is a thin stream trickling down drop by drop.

There is seldom any regurgitation in paralysis, but in slight cases, where semi-solids can be taken, patients often complain of the food lodging in the gullet.

Pathology.—The various lesions of the nerve-centres which may be met with after death have already been referred to under the head of "Etiology." My own experience in this affection is entirely clinical, and I have never had an opportunity of making an autopsy in a case of either central or local paralysis of the gullet. In most instances there is probably more or less degeneration of the muscular tunic of the œsophagus, and possibly some structural lesion of the nerves themselves.

Diagnosis.—It is important to distinguish paralysis both from spasm and from malignant disease.

In spasm the dysphagia is intermittent, the patient being sometimes able to swallow quite well, whilst at other times he cannot get down a morsel of food. On the other hand, in paralysis the dysphagia undergoes little, if any, variation. In spasm it is often quite impossible to pass a bougie, whilst, as already remarked, in paralysis there is seldom any difficulty in using that instrument. In the latter affection there is no regurgitation, but in spasm this is often very marked. The acoustic signs are also quite different; for whilst in paralysis only a confused gurgling noise is heard, in spasm a sharp click can be perceived, sometimes in one part and sometimes in another. Again, whilst paralysis more frequently affects the old and feeble, spasm is more often met with in the young and hysterical.

Cancer, like paralysis, is a disease which occurs in the decline of life, but the comparatively rapid progress of malignant disease soon sets the question of diagnosis at rest.

Moreover, in cancer there is always obstruction to the passage of a bougie.

Although the diagnosis of œsophageal paralysis is generally very easy, there are some cases where the affection probably altogether escapes observation, owing to the pharyngeal contraction forcing the food through the gullet. For the experiments of Chauveau[1] clearly show that even in complete paralysis of the œsophagus from section of its motor nerves vigorous contraction of the pharynx can impel the food into the stomach. Although Chauveau's observations were made on the horse, it seems reasonable to infer that the almost vertical position of the canal in man would render the passage of food still easier.

Prognosis.—This, of course, depends on whether the disease be local or central. In the simple local paralysis due to muscular weakness, the prognosis is always favourable. Long-standing cases can generally be benefited, and those of shorter duration can be cured. In cases of diphtheria and lead poisoning the prognosis is very favourable, but when the œsophageal paralysis is due to the coarser forms of nerve-disease, the prospect must always be most grave.

Treatment.—In the more severe forms of paralysis, little can be done in the way of treatment, but in the simple local cases a cure can often be effected. In all cases treatment must be directed to the *fons et origo mali.* In the milder local form of paralysis attention must be paid to the general health, and tonics, such as strychnia, iron and ergotine, are often of advantage. The patient requires a nourishing and stimulating diet, and a glass of wine taken at the commencement of a meal acts beneficially both as a local and a general stimulant. Condiments should always be freely taken, and the patient should be encouraged as far as possible to eat solids. Pungent viands are more likely to stimulate the constrictors to reflex action than soft insipid food. In the way of local treatment topical stimulants, such as a benzoic acid lozenge of the Throat Hospital Pharmacopœia, taken five minutes before eating, will often prove most serviceable. The value of electricity was recognized at an early date, Monro[2] having reported several cases in which the external use of it was followed by marked improvement, and in some by cure.

The best method of applying electricity, however, is by internal faradism. The positive pole being placed, by means of the necklet, in contact with the spinous processes of the upper cervical vertebræ, the negative pole is applied to the interior of the gullet by means of the œsophageal electrode (Vol. ii. p. 17). This instrument should be used at least daily, and if possible, several times in the day. The best time for it is before meals. On each occasion the electrode should be introduced three or four times, and retained *in situ* for a few seconds whilst a succession of shocks are passed. The treatment generally requires to be continued for several weeks, but after the first week or two the application need not be made so often. By this method I every year cure a large number of patients.

---

[1] "Journ. de Physiologie de Brown-Séquard," t. v. p. 327.

[2] "Morbid Anatomy of Gullet, &c." Edin. 1830, 2nd ed. p. 290.

Palliative measures must be adopted when those of a more radical character fail, and in connection with this point some hints may perhaps be obtained from cases like that of Willis,[1] already referred to (see "History"). Baster[2] has also supplied a somewhat similar illustration where a girl, who for fourteen months had fed herself by pushing her food down with a probang, ultimately recovered her power of swallowing. Desault[3] claims to have cured a man by feeding him with a tube, and Sédillot[4] mentions an instance of a young woman whose power of swallowing was completely restored by blisters to the neck, ammonia liniment, and gargling and swallowing mustard-and-water.

The following is a remarkable illustration of œsophageal palsy dependent on a central cause:—

Master W. B. C., aged sixteen, of Utica, New York, U.S.A., was brought to me[5] on June 18th, 1880. Besides the usual ailments of childhood, he had suffered at various times from "croupy" attacks, but for the three or four years preceding the onset of the complaint for which my advice was sought, he had enjoyed uninterrupted good health. In May, 1879, whilst playing at base-ball, he noticed that whenever he threw the ball a sharp pain seemed to shoot through the region of the larynx. This pain was of only momentary duration, but for several days afterwards he had frequent tingling, shooting sensations down the left arm from the shoulder to the wrist. He continued, however, to play ball daily, and on one occasion, about a fortnight after the occurrence of the laryngeal pain mentioned above, he became conscious, whilst *greatly excited* in the middle of a game, that he had some difficulty in swallowing.[1] That evening it cost him some effort to eat his supper, and on the following day the dysphagia had become so great that he could only swallow liquids, which, however, were occasionally thrown back through the nose. About the same time Master C. was attacked with almost constant hiccough, and his voice acquired a nasal twang. Dr. Gray, of Utica, was called in, and found it necessary to feed him with the help of a stomach-tube during three weeks. The patient then somewhat recovered his power of swallowing. In July, 1879, he had a fit of dyspnœa, followed by several similar paroxysms during the autumn. The difficulty of breathing gradually grew more persistent, and in January, 1880, the number of respirations had fallen to six per minute. Tracheotomy was performed about this time by Dr. Hutchinson, of Utica, and Master C.'s breathing was relieved, but his dysphagia did not improve. He gained weight, however, and his general condition was fairly satisfactory, but his left arm remained weak and somewhat numb, and he became partly deaf in the left ear.

---

[1] "Pharmaceutice Rationalis," part i. sect. 2. cap i.

[2] Referred to by Stalpaert van der Wiel: "Observ. Med. rarior." cent. 2. part i. obs. xxvii.

[3] "Œuvres Chirurg." Paris, 1801. t. ii. p. 291.

[4] "Recueil Périodique," t. xl. p. 81.

[5] The patient had previously been seen by Dr. Elsberg, to whom I am indebted for some information respecting the beginning of the malady.

When I saw Master C. I found him wearing a tracheotomy tube, but he was able to breath fairly well when its orifice was closed with a cork. His voice was rather feeble and slightly nasal (from imperfect action of the uvula). His left arm and left leg were weak, and his power of grasp with the left hand was decidedly less than normal. He walked in a somewhat unsteady way, and when his eyes were closed his movements resembled those of a patient suffering from locomotor ataxy. On the left side he could not hear a watch tick at a greater distance than nine inches from the ear. On the right side the hearing was perfect.

On inspecting the pharynx, the uvula was found to possess diminished sensibility, but was not drawn to either side. On laryngoscopic examination the vocal cords appeared to act imperfectly as regards abduction, adduction, and tension. The abductors, however, were chiefly affected, the utmost separation of the vocal cords in forced inspiration affording an opening only about one-third of the normal size. There was also diminished sensibility of the mucous membrane of the larynx. On directing the patient to swallow some water, the act of deglutition was seen to be very slowly and imperfectly performed.

Having treated several somewhat similar cases in conjunction with Dr. Hughlings Jackson, I requested him to see the patient with me, and the following is his report—"Discs normal, retinal veins strikingly irregular, patellar-tendon reflex quite absent." Dr. Hughlings Jackson thought that there was a small tumour pressing on the medulla. I venture to suggest that rupture of a small artery in the medulla took place during the violent exercise in which the boy was engaged, and that the subsequent development of the symptoms was due to sclerotic changes in the clot.

It need scarcely be said that I was unable to recommend the removal of the tracheotomy tube in this case, but whilst pointing out that no very remarkable results could be anticipated from treatment, I suggested that local faradism and galvanism might be tried on alternate days. This treatment was carried out by Dr. Ford, of

---

[1] A few days previously he had taken a large quantity of ice water whilst heated, and had eaten some ice cream, but this does not seem to have had any causal relation with his malady.

Utica, who forwarded the following report in October, 1880, after he had pursued the treatment for a short time—"I have applied electricity as you suggested, and observe that the parts are vastly more sensitive to electricity, but there is as yet no appreciable increase of motion." Dr. Hutchinson, of Utica, was good enough to send me, quite recently (December 5th, 1882), some notes which bring the case almost down to the present time. "I saw the patient yesterday," he says, "and found him quite strong and in apparent good health. He still wears the tube, although he can breathe for some time with it closed. As he inspires the nose contracts and becomes pinched, and he breathes with some effort. He has still difficulty in swallowing, and does not like to be seen at the table by strangers. He is still uncertain with his left arm and leg, and has fallen from his horse because he could not keep his left foot in the stirrup."

SPASM OF THE ŒSOPHAGUS.

(Synonym: Esophagism.)

Latin Eq.—Spasmus œsophagi.
French Eq.—Spasme de l'œsophage.
German Eq.—Krampf der Speiseröhre.
Italian Eq.—Spasmo del esofago.

Definition.—*Rigid approximation of the walls of a segment of the œsophagus through contraction of the circular fibres of its muscular coat, giving rise to dysphagia, varying in intensity and duration.*

History.—The affection was referred to by Hippocrates,[1] but only in a casual manner, and no other ancient writer seems to have been acquainted with it. In more modern times van Helmont[2] pointed out that difficulty of swallowing sometimes occurs in hysterical women, but he was under the impression that the symptom was due to an actual rising of the womb to the throat, which he thought caused temporary obliteration of the œsophageal canal. It was not till the early part of the eighteenth century that the disease was really made the subject of rational investigation by Hoffmann,[3] and little has been added since his time to the clinical knowledge of the affection. A short essay on "Spasmodic Disease of the Gullet" was published by Courant[4] in 1778, and a few years later Bleuland[5] briefly discussed the malady in the little treatise which has been already several times referred to, and in particular pointed out that spasm of the gullet is sometimes produced by the irritation of a neighbouring inflamed part, *e.g.*, by gastritis.[1] Several interesting examples of the disease were related by Monro,[2] and the subject also was treated of by Mondière.[3] A very full account of spasm of the gullet was given by Follin,[4] and more recently Hamburger[5] published an accurate account of the affection. A paper containing some important hints as to the diagnosis of the affection was written by Roux[6] in 1873, whilst soon afterwards some good examples of the complaint were reported by Foot,[7] and an important clinical lecture on the subject was published by the late Maurice Raynaud.[8] More recently the disease has been discussed in some detail by Zenker[9] and by Brazier,[10] whilst it has also been fully dealt with in recent volumes of the "Nouveau Dictionnaire de Médecine et de Chirurgie,"[11] and the "Dictionnaire Encyclopédique des Sciences Médicales."[12]

---

[1] "De Morbis." Littré's edition, l. iii. c. xii. vol. vii. p. 133.

[2] "Ignot. Act. Regim." § 43. Joannis Baptistæ van Helmont, "Opera Omnia." Francofurti, 1707, p 322; also "Asthma et Tussis." § 31. Ibid. p. 292, where he relates a case in which a woman had hardly swallowed anything for three months. He adds, "I came, recognized the disease, and immediately the Lord cured her," but van Helmont unfortunately omits to state *how*.

[3] "De morbis œsophagi spasmodicis" in F. Hoffmann, "Op. Omn. Phys. Med." Genevæ, 1740, t. iii. p. 132.

[4] "De nonnullis morbis convulsivis œsophagi." Montpellier, 1778.

[5] "De sana et morbosa œsoph. structura." Leidæ, 1785, p. 56.

---

[1] Ibid. p. 62.

[2] "Morbid Anatomy of the Human Gullet," &c. Edinburgh, 1811, p. 223; and 2nd ed. 1830, p. 268, et seq.

[3] "Œsophagisme"—"Archiv. Gén." 1833, t. i. p. 465.

[4] "Rétrécissements de l'Œsophage." Paris, 1853, p. 154, et seq.

[5] "Klinik der Œsophaguskrankheiten." Erlangen, 1871, art. iv. p. 94, et seq.

[6] "Diagnostic des Rétrécissements Spasmodiques de l'Œsophage." These de Paris, 1873.

[7] "Dublin Journ. of Med. Sci." April, 1874.

[8] "Annales des Maladies de l'Oreille et du Larynx." 1877.

[9] "Ziemssen's Cyclopædia of Pract. Med." 1878, vol. viii. p. 204.

[10] "Contribution à l'Étude de l'Œsophagisme." Thèse de Paris, 1879.

[11] Paris, 1877, t. xxiv. p. 359.

[12] Paris, 1880, 2e partie, t. xiv. p. 529.

Etiology.—Spasm of the œsophagus occurs more commonly in the female than in the male sex. It is most frequent in young women between the ages of eighteen and thirty, but it is often met with later in life, and sometimes, though very rarely, it occurs in childhood. I have twice seen it in patients under ten years of age. The affection, or at any rate, the nervous constitution which predisposes to it, is occasionally hereditary. In May, 1875, I succeeded in curing a patient whose mother and grandmother had both suffered from the same complaint. A case has also been reported by Stevenson,[1] in which he successfully treated a mother and her daughter for spasm of the gullet, the former having suffered from the complaint for twenty years, and the latter, aged twenty, all her life. When men are the subjects of œsophagism they are always of a highly emotional temperament, and are generally victims of hypochondriasis.

Spasm of the œsophagus may be (1) a mere psychical or hysterical phenomenon, or (2) it may occur in the course of certain nervous disorders, such as chorea, epilepsy, and especially hydrophobia; or (3) it may be due to some reflex irritation, the cause of which may be either in the gullet itself, or at a distance from that part; or (4) it may result from the strain of violent retching. Of the psychical causation of this malady, the most striking example is to be seen in the case of patients who imagine that they are suffering from hydrophobia. A remarkable instance[1] of this is the case of a man who, on returning to France after an absence of twenty years, was told that his brother had died from the effects of the bite of a dog by which he had himself been bitten. Shortly after hearing this news of his brother, he was seized with œsophageal spasm, which quite prevented him swallowing and ultimately proved fatal. A case is also related[2] of a man who was bitten by a favourite dog, which soon afterwards ran away. The master showed all the signs of hydrophobia until the dog returned, perfectly well, nine days after, when the man instantly recovered. Another remarkable example is related by Dr. Dolan,[3] on the authority of Trousseau, in which a man showed the characteristic signs of hydrophobia after a rabid dog had *tried* to bite him. The symptoms had come on after a feast, and vanished on his being made to vomit.

---

[1] "Med. and Phys. Journ." vol. viii. p. 35.

In the severe nervous diseases to which reference has been made, such as tetanus and epilepsy, the œsophagus sometimes participates in the spasm which affects so many of the other muscles of the body. In chorea, spasm of the gullet is less frequent, but I have seen two examples of this complication, In true hydrophobia, the muscles of the pharynx and œsophagus are specially involved.

Setting aside foreign bodies, the most frequent topical source of reflex irritation of the gullet is probably to be found in a gouty condition of the blood. Brinton,[4] who first called attention to this source of irritation, was of opinion that in lithæmia the acid condition of the blood causes spasm of the œsophagus, in the same manner that it produces cramp in the legs, or numbness and formication in various parts of the body. The immediate cause of the œsophageal spasm in these gouty cases often appears to be the eructation of acid matters. Amongst the reflex causes acting at a distance, diseases of the stomach, and affections of the uterus, may be mentioned. Of the former, Howship[5] has recorded two remarkable examples. One of these was that of a man who had been treated with bougies for four months on account of stricture of the middle third of the œsophagus. After death no stricture was found, but the stomach was in a state of "fungous ulceration for a hand's breadth." In another case, a lady, aged sixty-nine, suffered from spasmodic stricture of the upper part of the gullet, which was relieved by the passage of bougies. The patient, however, still continued to vomit a glairy fluid, and ultimately sank from exhaustion. At the post-mortem the stomach was found to be a mass of scirrhus, whilst the œsophagus was perfectly healthy. A similar case has been reported by Munro.[1] Another instance was related by John Shaw,[2] in which he had treated a patient for organic stricture of the œsophagus. After death the dysphagia was found to have been caused by ulceration of the larynx. The affection has been known to be caused by metritis, and to disappear on the cure of that disease.[3] I have myself met with two patients who always suffered from œsophageal spasm when pregnant, but were relieved immediately after parturition. As an analogous case, I may mention that I formerly treated a lady in whom the spasm came on whilst she was suckling. This recurred to such an extent at the birth of each child that she was never able to nurse. The case reported by Bettali,[4] in which the presence of a tapeworm in the intestinal canal gave rise to spasm of the œsophagus, and that referred to by Bouteille,[5] in which the affection was caused by the existence of worms in the ear, may be mentioned as other examples of reflex action. There are two cases on record in which the spasm is said to have resulted from vomiting. One is related by Sir Everard Home,[6] in which a lady, after severe sea-sickness, was quite unable to swallow owing to spasmodic contraction of the gullet. From the description of the symptoms, however, I am disposed to believe that this was really a case of acute inflammation. The other, which is mentioned by Carron,[7] is more to the purpose. Here, intense spasm followed sickness induced by the use of emetics. An extraordinary case of an opposite character is mentioned by Home,[1] of a young man in whom difficulty of swallowing, apparently spasmodic in character, which had existed since childhood, was *relieved* for weeks at a time after violent retching.

---

[1] "Bibliothèque Méd." t. xxxix. p. 234.

[2] "Dict. Encyclop. des Sci. Méd." t. xiv. p. 530.

[3] Quoted, with many other illustrations, by Dr. Dolan in his admirable "Report on Rabies or Hydrophobia" (pp. 82, 83), as Commissioner for the "Medical Press and Circular," 1878.

[4] "Lancet," 1866, pp. 2 and 253.

[5] "Practical Remarks on Indigestion." London, 1825.

---

[1] Op. cit. p. 266.

[2] "Lond. Med. and Phys. Journ." vol. xlviii. p. 185.

[3] "Archiv. Gén." t. xxxi. p. 474.

[4] Quoted by Mondière: "Arch. Gén." 1833, vol. i.

[5] Ibid.

[6] Op. cit. p. 549.

[7] "Recueil Périodique," t. xl. p. 58.

As regards the actual mechanism of spasm, Dr. Andrew Smith[2] has advanced the following ingenious hypothesis:—"In normal deglutition," he observes, "the contact of the bolus with the mucous membrane of the gullet produces an impression which is reflected to the muscular coat at a point *above* the mass which is being swallowed, and thus the resulting wave of contraction follows immediately after the bolus and forces it downward. But in spasm of the œsophagus, it would seem that the excitation is reflected to a point *below* instead of above the bolus, so that the resulting contraction presents an effectual obstacle to the passage of the alimentary mass, or even forces it upward."

Symptoms.—Dysphagia is always complained of. It varies in intensity from a slight feeling of difficulty in performing the act of deglutition, which can be overcome by an effort of the will, to an almost total inability to swallow. In slight and recent cases, solids or semi-solids are swallowed more easily than liquids, but as the disease becomes more established fluids pass the more readily, and warm drinks can be taken with less trouble than cold ones. The dysphagia is also, as a rule, more or less paroxysmal, occasionally coming on in the middle of a meal, but sometimes it lasts, with slight intermissions, for months, or even years.

Seney[3] relates a case in which the morsel of food was seized in the œsophagus and could neither be swallowed nor rejected, the most severe cramp being felt at the same time in the throat. This is a rare symptom, and, so far as I am aware, it has not been mentioned by any other writer. I have myself never met with an example of this kind of spasm.

In cases of spasm the patient not only cannot swallow, but generally has very little inclination for food. Regurgitation is sometimes present, and when it does occur, it comes on instantaneously after swallowing, there being no appreciable interval as in organic stricture. The food, under these circumstances, is sometimes rejected with so much force that it is thrown quite out of the mouth. Slight odynphagia

---

[1] Op. cit. p. 550.

[2] "Virginia Med. Monthly." 1877, vol. iii. No. 34. p. 713.

[3] "Œsophagisme Chronique." These de Paris, 1873.

may be complained of, and an uneasy sensation, or even a little pain may occasionally be felt between meals. Sometimes the sufferer experiences the well-known feeling of a "ball rising in the throat." Hamburger[1] indeed believes that "globus hystericus" consists in a wave of spasm affecting successive segments of the gullet from below upwards. He observes that if a patient can be examined with the stethoscope at the moment she experiences the sensation of "the ball" rising, a sudden contraction of the œsophagus and the ascent of a bubble of air will be heard. On the other hand, Rosenthal[2] found in two cases that galvanization of the hypoglossal nerve immediately inhibited the spasm of the œsophagus; and he considers that the fact that the patient can swallow whilst the "globus hystericus" is felt, proves that the phenomenon cannot be due to cramp of the œsophageal muscles. A case, however, has recently come under my notice which directly controverts the last statement. The patient, a lady, aged sixty-two, whom I saw in consultation with Mr. Buée, of Slough, had been suffering on and off for several months from spasm of the gullet. She often went several days without swallowing a particle of food or drinking a drop of liquid. I saw her make the attempt, but violent coughing at once came on from the drink passing into the windpipe. When the spasm relaxed, however, the patient was able to swallow easily. She stated of her own accord that the sensation in the throat was like a ball—in fact, like "hysteria," as she had experienced it when a girl. The patient also assured me, *proprio motu*, that as long as this sensation lasted nothing would go down the throat.

Emaciation is often altogether wanting, and never bears any proportion to the duration and apparent severity of the obstruction; often, indeed, well-nourished women are met with who declare that they cannot swallow at all. Expuition only occurs when the spasm is very severe, both as regards intensity and duration. There is seldom any alteration of the voice or cough, except when the spasm of the gullet is reflected from the larynx.

Auscultation of the œsophagus often affords valuable information. Thus *the point of obstruction may be heard to vary*

---

[1] "Klinik der Œsophaguskrankheiten." Erlangen. 1871, 4 art. p. 94.

[2] "Handbuch der Diagnostik und Therapie der Nervenkrankheiten," p. 245.

in situation. The first morsel may be arrested or retarded at the upper part of the œsophagus, whilst the second or third morsel is stopped two or three inches lower down ; or whilst the act of deglutition is arrested or delayed one moment, it may be performed perfectly the next. This is an absolute proof of the spasmodic character of the affection. Again, the morsel may be heard to be arrested or forced upwards for a second and then to pass down the gullet. There is generally not nearly so much of the bubbling or gurgling sound as is met with in organic stricture or œsophageal diverticula. On passing a bougie, an obstruction will generally be felt in the region prone to be contracted, which is usually near the upper or lower orifice of the gullet, but much more frequently the former. The obstruction can often be overcome by moderate force, but sometimes the spasm is so tight that it will not yield to anything short of violence. In such cases repeated attempts should be made on different occasions to pass the instrument. Sometimes a rapid attempt to introduce it will succeed when a slower one fails, but more often the spasm gives way before steady pressure. If the patient be placed fully under the influence of an anæsthetic, all difficulty in using the instrument will disappear. It may be remarked here that in some cases the passage of the bougie causes great pain, a phenomenon probably dependent on the existence of extreme congestion of the lining membrane.

Diagnosis.—The age, sex, and nervous temperament of the patient are of help in arriving at an accurate diagnosis. The abrupt commencement and intermittent character of the dysphagia, the suddenness of regurgitation (when it occurs), the fact that in most cases the obstruction can be overcome with the bougie, and the absence of emaciation are the salient features. In paralysis of the gullet, the dysphagia is *constant*, and in malignant disease it is nearly always *progressive*.[1]

Pathology.—The affection consists essentially of a spastic contraction of the circular fibres of the muscular coat of the œsophagus. Its more frequent occurrence at the extremities of the tube is explained by the greater abundance and higher development of the circular fibres in those situations.

---

[1] It might be extremely difficult to distinguish true spasm from the condition known as *dysphagia lusoria*. This is generally said to arise from the compression to which the gullet is subjected by the right subclavian artery when, as an abnormality, it springs from the arch of the aorta. In its course from the left to the right side of the chest, the vessel must of necessity pass either in front of, or behind the gullet, which may thus be pressed on. More or less intermittent dysphagia will in this manner be produced. The existence of this form of dysphagia is, however, altogether denied by some writers.

A perverted or unstable condition of the nervous centres is doubtless necessary for the production of the affection, and hence the complaint occurs in connection with hysterical and other nervous disorders.

Although it is highly probable that whenever muscles are repeatedly thrown into a state of spasmodic contraction, both myopathic and neuropathic changes ensue, yet such morbid alterations of structure have not hitherto been observed. Even in hydrophobia. there is seldom any appreciable change to be seen in the condition of the œsophageal canal. In tetanus, Larrey[1] found the œsophagus and pharynx tightly contracted after death.

Prognosis.—The prognosis is generally favourable in recent cases, but where the disease is of very long standing, like many other nervous affections it becomes intractable. It is apt to lead to narrowing of the œsophagus, and may sometimes predispose to cancer or determine the site of its development. Even when the disease is of only moderately long duration the cure is often protracted, and relapses are apt to occur.

Cases have been reported which have resulted in death, though no disease could be found in the œsophagus. Mr. Power[2] has related a remarkable instance which was seen by several eminent members of the profession, in which the spasm was sufficiently severe to destroy the patient, a man aged forty-eight, by inanition, and yet after death no organic lesions whatever, in or around the gullet, could be found to account for the symptoms. A case has also been recorded by McKibben,[3] in which death occurred in five days, spasm of the gullet, with absolute aphagia, and profound prostration of the nervous system being the only marked symptoms. There was no obstruction, and a stomach-tube could be easily passed, but the utmost efforts of the patient to swallow were quite unsuccessful. The case, however, is very incompletely reported, and no autopsy was made. It seems highly probable that paralysis rather than spasm was the cause of the dysphagia.

---

[1] "Mém. de Méd. Chir. et Pharm. Milit." t. xiv. p. 175.

[2] "Lancet." 1866, vol. i. p. 252.

[3] "Amer. Journ. Med. Sci." Oct. 1859. Quoted by Andrew Smith: Loc. cit.

Treatment.—When the affection depends on serious disease of the general nervous system, the attention of the practitioner must be directed to the fundamental lesion. Thus, in hysteria the patient must be braced up by moral, as well as by hygienic and medicinal agencies. His mind should, if possible, be kept employed by regular and interesting occupation, or by change of scene and travel. By passing a bougie, and assuring the patient that there is no obstruction, such persons may sometimes be made aware of the groundlessness of their sensations. If the disease is believed to be of reflex origin, the cause must be sought out and if possible removed. Where the affection results from a gouty condition, an alkaline draught containing bicarbonate of potash and aromatic spirits of ammonia, will often at once give relief. Other drugs are sometimes of great service. I have employed bromide of potassium with marked benefit in several cases, and it has also been found useful by Gubler[1] and Amory,[2] but valerianate of zinc in combination with assafœtida has proved even more effectual. In many cases the passage of bougies lessens the irritability of the canal and speedily brings about a cure, and it may be remarked that, as a rule, the ivory-knobbed bougies answer better for the purpose than the ordinary gum-elastic instrument. The bougie, which must be warmed, should either be kept *in situ* for a minute or two, or it should be slowly moved up and down the gullet; but it should not be used when there is hyperæsthesia of the mucous membrane. Under such circumstances it is better to treat the case at first with injections. Various mineral astringents, such as chloride of zinc or perchloride of iron, may be used, but a weak solution of nitrate of silver (gr. v. or gr. x. ad ℥j.) answers best. The solution should be warmed, and about half a drachm injected into the gullet with the "œsophageal injector" (Vol. ii. Fig. 4, p. 17) as nearly as possible at the seat of spasm. Three or four injections made on alternate days will often effect a cure, or they will relieve the irritability so much that bougies can subsequently be employed. Broca[3] cured a patient by forcibly opening the stricture with a dilator, but I believe that his case would have yielded to bougies. If, however, mechanical measures do not succeed, galvanism will almost invariably conquer the disease. Indeed, this remedy is so certain, that, if ordinary medication fails, I at once have recourse to it. A ten or twelve-celled battery should be used. The œsophageal electrode should be introduced into the gullet at least once a day, and kept in position for a minute or two or longer if the patient can bear it. The application should be made at such a time that a considerable interval may elapse between the treatment and the next meal. After a week or ten days, the application should be made on alternate days for a fortnight, when the cure will generally be complete.

---

[1] "Bull. Gén. de Thérap." 1864, t. 67, pp. 10, 11.
[2] "Dict. Encyclop." vol. xiv. p. 538.
[3] "Gazette des Hôpitaux." Aug. 7, 1869.

The dietary in these cases is of the greatest importance. If the spasm is very severe, thickened liquids should be given, and it is well to bear in mind the fact, which has been already pointed out, that warm drinks are much less apt to bring on spasm than cold ones. It is remarkable, too, than in nine cases out of ten if the drink be sweetened it is better borne. Gradually the food may be thickened, and panada[1] may be allowed. If the case progresses favourably, the patient will be able to return by degrees to ordinary diet. Stimulants should not, as a rule, be given, and all *pungent* food should be prohibited. It is the greatest mistake to force these patients to take solid food before the cure is complete. They may sometimes be tricked out of their malady when it is slight and recent, but rough measures always fail.

MALFORMATIONS OF THE GULLET.

Latin Eq.—Deformitates ingenitæ œsophagi.
French Eq.—Vices de conformation de l'œsophage.
German Eq.—Missbildungen der Speiseröhre.
Italian Eq.—Vizi di conformazione del esofago.

Definition.—*Congenital irregularities in the formation of the œsophagus, resulting in an excess, a deficiency, or an imperforate condition of that tube. The first-named anomaly is exceedingly rare, and is only met with in disomatous monsters. Deficiency of a part of the œsophagus, generally affecting the middle third, together with an abnormal communication between the gullet and the trachea or one of the bronchi, is the most common deformity, and though met with in monsters and still-born children, is most*

---

[1] See Vol. i. p. 580.

frequent in infants who are born alive, but survive only a few days. The other deformities are too rare to require definition.

History.—In all probability, malformations of the œsophagus are of rare occurrence. All the recorded cases which I have succeeded in collecting amount to no more than sixty-two, and I am able to add only one from my own observation. These facts are especially significant when we remember that the condition, in viable infants at least, is attended by such striking symptoms, that it is hardly possible for them to escape notice, whilst the inevitably fatal result always affords an opportunity of investigating their cause. At the same time, it must not be forgotten that Hirschsprung himself personally observed four examples of the condition in less than seven months in a town of only 180,000 inhabitants, and that within three weeks Ilott met with two cases in a country district near London. It is, indeed, possible that if still-born infants, and especially monsters, were more uniformly submitted to careful dissection, malformations of the œsophagus would be found more frequently than the small number of published cases would lead us to suppose. The earliest recorded instance of œsophageal deformity appears to be that related by Durston in 1670.[1] Two cases were published by Blasius[2] in 1674, in one of which the tube bifurcated and again united, whilst in the other there was saccular dilatation of the gullet at its lower end. In 1791 an instance was recorded by Tenon,[3] in which there was membranous obstruction of the gullet in its upper part. In 1810 Brodie[4] reported a case in which there was blind termination of the tube, and a few years later Lozach[5] published an example of complete absence of the organ. In 1821 Martin[6] published an example of deficiency of a portion of the œsophagus, with intercommunication between the alimentary and respiratory tracts. It was not, however, till 1861 that the literature of the subject was collected. In that year, Hirschsprung,[7] in a small work of considerable merit, brought together ten cases of the affection, and further elucidated it by four examples which had come under his own notice. Since then, several fresh cases have been placed on record, whilst many others have been discovered in the annals of medical literature, and the following synopsis, I think, represents with a fair degree of completeness the facts published up to the present date.

Of complete deficiency there are five cases on record, viz., those of Lozach,[8] Sonderland,[9] Mellor,[10] Heath,[11] and a specimen in the Museum of the Army Medical Department at Netley.[12]

---

[1] "Collect. Academ." Partie étrangère. 1670, t. ii. p. 288.

[2] "Observ. med. rarior. Leidæ, 1674, tab. vi. fig. 5.

[3] Fourcroy: "La Médecine éclairée par les Sciences." 1791, t. i. p. 301.

[4] For the scanty particulars of this case the reader is referred to the French "Biblioth. Méd." 1810, t. xxx. p. 381, as I have been unable to find the original article.

[5] "Journ. Univ." 1816, t. iii. p. 187.

[6] "Exposé des Trav. de la Soc. Roy. de Méd. de Marseille." 1821, p. 44.

[7] "Den Medfodte Tillukning af Spiseroret." Copenhagen, 1861.

[8] "Journ. Univ." 1816, t. iii. p. 187.

[9] "Hufeland's Journal," August, 1820.

[10] "Lond. Med. Gaz." June 26, 1840, vol. xxvi. p. 542.

[11] Ibid. (Mellor's case is given in detail, but Heath's is only briefly referred to.

[12] "Catalogue of the Museum Army Med. Dept." 1845, p. 385.

Of blind termination there are nine examples, viz., those of Durston,[1] Brodie,[2] Roederer,[3] Marrigues,[4] Lallemand,[5] Van Cruyck,[6] Pagenstecher,[7] Warner,[8] and Pinard.[9]

Of cases in which there was an intercommunication between the œsophagus and air-passages, with deficiency of a portion of the former, or, as they have been called, "inosculating" cases, there are 43, the communication being with the trachea in 40, and with one of the bronchi in three. The former category includes the cases of Martin,[10] Houston,[11] Padieu,[12] Schöller,[13] Davis,[14] Tilanus,[15] Levy,[16] Gernet,[17] Luschka,[18] Cruveilhier,[19] Ayres,[20] Ogle,[21] Ward,[22] Willigk,[23] Steenberg,[24] Hirschsprung[25] (three cases), Maschka,[26] Bendz,[27] Boucher,[28] Annandale,[29] Luschka,[30] Porro,[31] Sundewall,[32] Périer,[33] Polaillon,[34] Ilott[35] (two cases), Lehmann,[36] Westbrook,[37] and Mackenzie,[38] together with specimens in the museums of the Royal College of Surgeons of Ireland,[39] of the Boston Society of Medical Improvement[40] (two cases), of the Army Medical Department at Washington,[41] and of the Royal College of Surgeons of England[42] (three cases).

The three cases in which there was a communication with one of the bronchi are those of Levy,[1] Hirschsprung,[2] and an example in the Dupuytren Museum at Paris.[3]

---

[1] "Collect Academ." Part. étrang. 1670, t. ii. p. 288.
[2] "Bibl. Méd." 1810, t. xxx. p. 381.
[3] Meckel: "Handbuch d. pathol. Anatomie." Leipzig. 1812, Bd. i. p. 424.
[4] Ibid.
[5] "Observations pathologiques propres à éclairer plusieurs points de physiologie." Paris, 1816.
[6] "Bull. de la Soc. Méd. d'Émulation de Paris." 1824, p. 251.
[7] v. Siebold's "Journal f. Geburtshülfe," &c. 1830, Bd. ix. p. 112.
[8] "Lancet," 1839, vol. ii.
[9] "Bulletin de la Soc. Anat." 1873.
[10] Loc. cit.
[11] "Dublin Hosp. Rep." 1830, vol. v. p. 311.
[12] "Bulletin de la Soc. Anat." 1835, t. x. p. 95.
[13] "Neue Zeitschrift f. Geburtskunde." Berlin, 1838, vol. vi. p. 2.
[14] "Lond. Med. Gaz." Jan. 13, 1843, vol. xxxi. p. 543.
[15] "Verh. van het Genootschap d. Genees en Heelk. te Amsterdam." 1844.
[16] "Neue Zeitschrift f. Geburtskunde." Berlin, 1845, vol. xviii. p. 436.
[17] Oppenheim's "Zeitschrift." 1847, p. 378.
[18] "Virchow's Archiv." 1848, vol. xlvii. p. 178.
[19] "Traité d'Anat. Pathol. génér." Paris, 1849, t. ii. p. 232.
[20] "Trans. Path. Soc." 1852, vol. iii. p. 91.
[21] Ibid. 1856, vol. vii. p. 52.
[22] Ibid. 1857, vol. viii. p. 173.
[23] "Prager Vierteljahrschr." Aug. 13, 1856, p. 34.
[24] Hirschsprung: Op. cit. p. 37.
[25] Ibid. pp. 39-50.
[26] "Allg. Wiener Med. Ztg." 1862, No. 9, p. 78.
[27] "Ugeskrift for Lager." 1867.
[28] "Bulletin de la Soc. Anat." 1868.
[29] "Edin. Med. Journ." Jan. 1869, vol. xiv. p. 598.
[30] "Virchow's Archiv." 1869.
[31] "Annali Universali di Medicina." Milan, 1871, t. ccxvii. p. 421.
[32] "Upsala Lakareför-nings Törhandlinger." 5te Bandel, 5te Haftet.
[33] "Union Médicale." 1873, No. 145, p. 894.
[34] "Gaz. des Hôpitaux." July 17, 1875.
[35] "Trans. Path. Soc. Lond." vol. xxvii. p. 149.
[36] "Schmidt's Jahrb." Bd. cxlviii. p. 269.
[37] "Annals of the Anat. and Surg. Soc. of Brooklyn." 1879, vol. i. pp. 98, 99.
[38] Published in detail at the end of this article.
[39] "Catalogue Roy. Coll. Surg. Ireland." "Anatomy," vol. i. p. 152. Dublin, 1834, Spec. Ga. 53.
[40] "Catalogue Boston Soc. of Medical Improvement." Specs. Nos. 456 and 457, p. 128.
[41] "Catalogue Mus. Washington," D.C. 1867.
[42] "Catalogue Mus. Roy. Coll. Surg. Eng." "Teratological series." London, 1872. Specs. 394, 395, 396.

Of intercommunication between the œsophagus and trachea (the œsophagus being otherwise normal) there are two cases, viz., those of Lamb[4] and Pinard.[5]

Of membranous obstruction there are two cases in which the œsophageal canal was completely blocked up, viz., those of Rossi[6] and Tenon;[7] and one in which a valve-like opening allowed food to pass with difficulty. In the case of Rossi the obstruction was just above the cardia, and the infant died on the third day; Tenon's case was similar, but the obstruction was in the upper part of the œsophagus. In the remaining case it is highly probable, although not absolutely certain, that the malformation was congenital.

The following are the particulars:[8]—An old woman had manifested great difficulty in swallowing *from early infancy.* Œsophageal vomiting came on when she attempted to take food otherwise than in very small morsels. After death a dilatation of the gullet was found. About six fingers' breadths below the pharynx there was a completely circular valve, with an opening about one centimetre in diameter. This valve seemed formed by a folding inwards transversely of the mucous membrane, involving the whole circumference of the tube, the free edge of the valve being strengthened by firm tendinous fibres running round it.

Of congenital pouch there is perhaps one example, viz., that of Blasius,[9] but the case is not given in sufficient detail to show whether the malformation was congenital or acquired.

Of longitudinal division of the œsophagus there also exists one example, related by the same author.[10]

---

[1] Loc. cit. [2] Op. cit. [3] Specimen No. 51.

[4] "Philadelphia Med. Times." 1873, p. 705.

[5] "Bulletin de la Soc. Anat." 1873.

[6] "Memorie dell'Academia delle Scienze di Torino." 1826, vol. xxx. serie 1a, pp. 155-170.

[7] Fourcroy: "La Méd. éclairée par les Sciences Phys." t. i. p. 301.

[8] "Bolletino delle Scienze Mediche," t. xix. p. 267, 1851.

[9] Loc. cit. Many cases of œsophageal pouch have been recorded, but as far as I am aware, in every instance the subject has been an adult.

[10] Ibid. Fig. 2.

Etiology.—The essential cause of congenital malformation of the œsophagus is involved in the same obscurity that hangs over the whole subject of teratology. It is obvious, however, that the deformity must arise from some abnormal conditions, either in the spermatozoon, in the ovum before impregnation, or in the embryo. That the first cause is sufficient to produce malformation is proved by the fact that the same male occasionally produces a similar deformity in the offspring of different women.[1] With reference to the second cause, it is well known that unimpregnated ova are not unfrequently diseased, and it is possible that such ova, if fertilized, would in some cases produce a malformed fœtus.

---

[1] Meckel: "Handbuch d. pathol. Anatomie." Leipzig, 1812, vol. i.

At the same time, so far as I am aware, no observations have been made in connection with the female element in reproduction analogous to that mentioned above in referring to the male element—that is to say, there is no instance on record in which the same female has by different males given birth to infants with a similar deformity. It is probable, however, that it is the third cause which is the most potent, and that by far the larger number of malformations of the œsophagus are due to disease of an embryo previously well formed, or to a displacement of formative material at a very early period of embryonic life; the main argument in support of this view being that even in cases where the gullet is partly absent, there are almost always traces of the obliterated portion. The most generally accepted view as to the immediate cause of œsophageal malformations is that they depend on "arrested development."[1] This view is probably correct so far as it goes, but it does not explain the *cause* of the arrested development. Schöller[2] considers that if the deformity were entirely due to imperfect evolution it would be more frequently met with, and Luschka[3] suggests that both influences, viz., disease and irregular development, are at work, and that in those cases in which the œsophagus and trachea intercommunicate, the sequence of events is somewhat as follows: First, the canal of the œsophagus becomes obstructed, then hypertrophy of the portion of it above the point of obliteration takes place, and the formative matter, being exhausted by the excessive development of the pouch, is not sufficient to close up the opening between the two canals. Hirschsprung[4] considers that the entire absence of anything in the least degree resembling a cicatrix refutes the idea of destructive ulceration, but it is probable that the effects of inflammation and ulceration occurring in the earliest period of fœtal life would be entirely obliterated at the time of birth. The frequent coexistence of other deformities with malformation of the œsophagus has been regarded as evidence that the latter depends on imperfect evolution, and not on disease. This is merely begging the question: the facts sustain equally well the theory that in such cases the embryo is extensively diseased.

If a glance be taken at the normal development of the œsophagus and trachea, as recently described by Kölliker,[1] it will facilitate the comprehension of the mode in which the malformation may arise through some slight morbid deflection of the normal process.

---

[1] Meckel: Loc. cit. Bischoff: "Beiträge zur Lehre von den Eyhüllen des Menschlichen Fötus." Bonn, 1834.

[2] Loc. cit.

[3] Loc. cit.

[4] Op. cit.

The whole intestinal canal, from the mouth to the anus, is formed of three segments, *i.e.*, a middle portion and two extremities. The former is called "the primitive intestine," the latter are the "cephalic" and the "pelvic" portions.

The primitive intestine is formed in mammals by the separation of the hypoblast and a layer of the mesoblast from the germinal vesicle. At first it consists of a groove or "semi-canal," but soon becomes transformed into a complete tube. Like the whole intestinal canal, this primitive intestine is also divided into three portions, an anterior, middle, and posterior. It is from the anterior portion that the pharynx, œsophagus, larynx, trachea, and lungs are developed. The opening of the primitive lung into the anterior portion of the primitive intestine is situated in mammals at the junction of the pharynx and œsophagus. In rabbits, on the tenth day, the anterior portion becomes differentiated into a ventral and a dorsal division. The ventral part is the germ for the lungs, larynx, and trachea, whilst the dorsal portion is the nucleus of the pharynx and œsophagus. The lower part of the ventral division becomes expanded to form the lung, which at that time consists of a semi-canal terminating in two vertical grooves, and freely communicating on its dorsal side with the œsophagus by means of a linear fissure, somewhat wider at its lower end. A separation of the two organs takes place on the eleventh day, the anterior portion of the primitive intestine being thus differentiated into an anterior or tracheal segment, and a posterior or œsophageal segment. The separation proceeds from behind forwards up to the level of the laryngeal orifice in the pharynx, and gradually becomes more and more complete. Above the laryngeal aperture no demarcation takes place between the air-passages and the digestive canals. The process just described occurs in the human fœtus in exactly the same manner. Kölliker saw an embryo of four weeks in which the two tubes were almost completely separated, only a thin membrane intervening between them. The sac-shaped lungs constituted at that time a prominence at the lower end of the œsophagus, covering it on each side like a saddle. Whether at that time a fissure-like communication still existed between the tracheal and œsophageal tubes is not clear from Kölliker's description. In any case, however, it is probable that, by the beginning of the second month, the entire separation of the two tubes is an accomplished fact.

The cephalic portion of the intestine originates from the epiblast. It grows backwards to meet the pharyngeal extremity of the anterior part of the primitive intestine, until they are separated only by a thin membrane (the pharyngeal membrane of Remak).[2] The membrane then disappears, and its residue forms the arcus palati and uvula.

---

[1] "Entwickelungsgeschichte des Menschen." Leipzig, 1879, p. 810, &c.

[2] In the two cases of "obliteration" of the œsophagus referred to, and probably in some of the examples of "blind termination," the malformation was probably due to non-obliteration of this normal embryonic membrane, and it might have been expected that obstruction of the *pharynx* itself would sometimes result from the same arrest of development. I am not aware, however, of

Symptoms.—The phenomena of congenital malformation of the œsophagus are so characteristic, that when present they will at once be recognized. The infant may appear healthy whilst at rest, but the moment it attempts to swallow the most distressing attacks of suffocation supervene, and there is great danger of one of these proving fatal. In Porro's case, actual suffocation appears to have taken place through a large quantity of milk passing into the air-passages, but as a rule the infant becomes gradually weaker, and expires at the end of a few days from exhaustion. When the malformation affects the upper portion of the tube, it can sometimes be felt on passing the finger down the pharynx of the infant. At other times, the use of a bougie will reveal the condition of the canal, the instrument being arrested at the end of the œsophageal pouch. Although in most cases no instrument reaches the stomach, meconium is often passed.

Pathology.—The appearances after death vary according to the nature of the deformity. Where the œsophagus is absent, the pharynx ends in a cul-de-sac, and the stomach is generally adherent to the diaphragm. Of the five instances of this kind one was an anencephalous monster; in another the pharynx, larynx, and trachea were wanting; and in two the condition of the other organs is not stated. In cases of blind termination the gullet may terminate quite high up, as in Roederer's case, or may reach nearly to the stomach, as in that of Warner. In the records of this class of cases, the other organs—especially the intestinal canal—generally show a wide departure from the normal form: thus, in one instance[1] the stomach was deficient, the intestinal canal consisting of two parts, one comprising the colon and rectum, the other the small intestine; the latter terminated at both ends in a blind sac, and the upper portion of the larger bowel was closed in a similar manner. In another case,[2] the intestinal canal was divided into four parts, each terminating at both ends in a blind extremity, whilst the anus was imperforate. In a third example,[3] the fundus of the stomach was wanting, but in its place was a wide round opening, the edges of which were formed of muscular tissue. In a fourth instance,[4] the brain was imper-

[1] Roederer: Loc. cit.

[2] Marrigues: Loc. cit.

[3] Pagenstecher: Loc. cit.

[4] Lallemand: Loc. cit.

---

the existence of any case supporting this view. It may be added that common as are pouches of the pharynx there do not appear to be any proved examples of congenital deformity on record.

fectly developed, and the upper part of the œsophagus communicated through the vertebral canal with the mouth. In a fifth case the subject was an anencephalous monster.[1] In other examples of this variety of malformation the condition of the other viscera is not stated. The cases, however, in which there is deficiency of a greater or less amount of the middle third of the œsophagus, with inosculation between it and the air-passages, are the most common, and the most interesting to the pathologist. Here the upper part of the gullet usually terminates in a dilated pouch about half an inch above the bifurcation of the trachea, whilst the lower portion generally originates from the windpipe still closer to the bifurcation, and passing downwards enters the stomach in the ordinary way. The portion of the œsophagus immediately at its origin from the trachea is generally very narrow, but as it descends it acquires its normal size. The upper portion, or pouch, is always much dilated, and its walls considerably thickened. Sometimes the pouch-like expansion is limited to the gullet (as in my case), whilst in others (as in those of Ilott) the enlargement involves the pharynx also. The two separate portions are generally connected by a small band of muscular or tendinous fibres. In my own case (see Vol. ii. Fig. 22 B) the lower extremity of the pouch (*a'*) actually overlapped the lower segment of the œsophagus (*b'*) where it proceeded from the trachea. On laying open the gullet, the lining membrane is almost invariably seen to be perfectly free from disease. In only one[2] out of all the recorded cases is there any mention of ulceration of the mucous membrane, and in that instance the lesion was superficial, and was no doubt caused by the retching and straining which occurred on attempting deglutition. On dividing the trachea, the opening of the œsophagus may generally be seen as a small aperture situated in its posterior wall and directed downwards. Sometimes the opening is described as oval and sometimes as round in shape, but in my specimen (Fig. 22 C *b''*) the aperture is distinctly crescentic—the concavity being directed downwards. In this specimen (Fig. 22 C *a''*) the hypertrophied pouch of the œsophagus forms a projection on the posterior wall of the trachea, which considerably diminishes its lumen. In one of Hirschsprung's cases,[3] more or less complete *cartilaginous rings* were found at the *lower end of the œsophagus.*

---

[1] Pinard's second case: Loc. cit.

[2] Scholler: Loc. cit.

[3] Op. cit. case 7, p. 35.

As regards the associated deformities, in one instance[1] there were spina bifida, absence of anus, and a single horse-shoe kidney placed over the spine. In two cases there was trifurcation of the trachea,[2] and in two others there was atelectasis pulmonum.[3] In another case, the stomach and intestines were contracted.[4] The other deformities associated in different cases with œsophageal inosculation were: malformation of the uterus;[5] combination of the male and female genital organs;[6] imperforate anus with a communication between the intestine and bladder and deformity of the pelvis;[7] absence of right lung and atresia ani;[8] imperforate anus with intercommunication between bladder and rectum, deficiency of the radius in each arm, and clubbed hands;[9] imperforate anus with intercommunication between rectum and urethra and right auriculo-ventricular opening almost blocked up by membranous diaphragm.[10]

In only three instances is it expressly stated that there was no other deformity; whilst in nineteen cases there is either no mention of the condition of the other organs, or it is formally stated they were not examined.

Diagnosis.—There is no disease for which this malformation can be mistaken. The absolute inability to swallow, which cannot fail to be observed from the first time the infant attempts to suck, is characteristic; whilst, if a measured quantity of milk be administered with a teaspoon, and the ejected fluid collected, it will be found that it is all returned. The diagnosis can be further verified by the passage of a catheter. In new-born children the minimum diameter of the œsophagus is four millimetres, whilst the distance from the border of the gums anteriorly to the cardiac orifice of the stomach is seventeen centimetres.[11] If, therefore, a catheter of suitable size cannot be passed for this distance, it may be presumed that there is a congenital obstruction.

Prognosis.—As already stated, infants born with a malformation of the œsophagus generally succumb in a few days, the duration of life probably depending more upon the vigour of the child when born, than on the exact nature of the malformation. Thus, in five cases of complete deficiency of the œsophagus, one infant lived seven days, another eight days, a third "a few days," whilst in the two others no information is given on this point, though, from the context, it is possible that the infants were both born dead. In eight cases of blind termination, three infants lived to the third, fourth, and fifth day respectively, whilst in five cases the duration of life is not stated. In thirty-seven cases, in which there was inosculation between the œsophagus and air-passages, the duration of life was as follows:—

---

[1] Davis: Loc. cit.

[2] Hirschsprung: Loc. cit.

[3] Ibid.

[4] Padieu: Loc. cit.

[5] Spec. 457, Boston Museum.

[6] Levy: Loc. cit.

[7] Hirschsprung: Op. cit.

[8] Maschka: Loc. cit.

[9] Pinard's first case: Loc. cit.

[10] Polaillon: Loc. cit.

[11] Mouton: "Du Calibre de l'Œsophage." Paris, 1874, p. 61.

Date of death.	Cases.
Two hours after birth	1
Second day	8
Third day	4
Fourth day	6
Fifth day	4
Sixth day	1
Seventh day	1
Ninth day	1
Eleventh day	2
Twelfth day	1
A few days	1
Not stated	7

In one of the cases in which the gullet and trachea intercommunicated, whilst the former was otherwise normal, the patient lived seven weeks. The cause of this comparatively long existence will be understood from the following description:—

"In the median line, nearly half an inch below the lower border of the cricoid cartilage, was a fistulous communication between the two tubes, having a longitudinal diameter of three lines, and a transverse diameter of one line. The direction of the fistula was downwards and backwards, the opening in the œsophagus being at a lower level than in the trachea; the edges were smooth and rounded, and the mucous membrane normal. The danger of passage of the contents of the œsophagus into the trachea appears to have been guarded against to some extent by the close apposition of the walls of the fistula." [1]

In one of the two cases of membranous obstruction of the œsophagus, the patient lived till the third day; in the other the duration of life is not stated.

Treatment.—In none of the recorded instances was any attempt made to preserve the life of the infant by any surgical procedure, and it is obvious that but little hope can be entertained of relief by art, as the opening into the air-passages, which is so often present, would probably interfere with the maintenance of life even if the œsophageal canal were patent throughout. Mr. Holmes[1] thinks that where no tracheal communication can be made out an operation might be attempted. "The object," he observes, "would be to cut down upon the point of a catheter passed down to the pharynx, and then to attempt to trace the obliterated œsophagus down the front of the spine, until its lower dilated portion is found. A gum catheter would then be passed through an opening made in the upper portion, and so into the stomach through the lower portion. If the two portions are near enough to be connected by silver sutures over the catheter, and if the latter can be retained until they have united permanently, success might possibly be maintained." Such an operation would evidently be extremely hazardous and difficult, if not impracticable. Gastrostomy has been recommended by Sédillot, who remarks: "In all cases where the œsophagus is simply obliterated, atrophied, or interrupted, gastrostomy would give the hope of saving the infant, without any accident except that of the operation itself. If there exists a communication between the lower end of the œsophagus and the trachea, there is a risk that food received into the stomach would be regurgitated into the air-passages; but the narrowing of the abnormal opening, and its natural tendency to close, would afford some security against such an inconvenience." Whilst quoting the views of this eminent surgeon, I cannot endorse them, as I consider that section of the stomach and the subsequent artificial alimentation of a newly-born infant could not be attended with satisfactory results. The following case illustrates the malformation:—

---

[1] Lamb: Loc. cit.

In September, 1879, I was consulted (on the advice of Dr. Walker, of Putney) by the father of a male infant, eight days old. The history of the case, as supplied to me by Dr. Walker, was as follows:—

Mrs. S., a primipara, gave birth to a male infant in September, 1879. At birth the child was feeble and badly nourished, and had difficulty both in breathing and crying: there was also a constant rattling noise in the throat, which continued in spite of all efforts to remove the mucus. On the following day milk and water was given, but it was at once rejected through the mouth and nostrils: later in the day the breathing became more troubled. Dr. Walker administered a measured quantity of milk and water, and having taken steps to receive all that was ejected from the mouth and nose, found that nearly all the ingesta were returned. Next day the child was able to keep down a very small quantity of milk, but he had become extremely emaciated, and appeared to be sinking. Enemata of milk and lime-water were given, and a small quantity of brandy and water was occasionally administered by the mouth. On the fourth day Dr. Fenn, of Richmond, saw the child with Dr. Walker, and on passing a gum-elastic catheter down the pharynx, they found its course completely arrested about two inches below the cricoid cartilage. During the next few days the child seemed to improve, the breathing became easier, and crying and coughing much stronger. Drs. Walker and Fenn having arrived at the conclusion that the case was one of obstruction of the œsophagus, consulted me as to whether I was prepared to perform any operation with a view of overcoming the difficulty. I did not, however, feel myself justified in recommending any operative procedure, and the child died from exhaustion on the eleventh day after birth.

---

[1] "The Surgical Treatment of the Diseases of Infancy." London, 1869, 2nd ed.

The father of the infant stated that a former wife had given birth to a child which died after nineteen days with exactly the same symptoms as those recorded in this instance. No other child of his had any malformation.

A post-mortem examination, limited to the throat, was made by Dr. Walker and Mr. Hovell, with the following results:—The infant was of ordinary size and well formed, but much emaciated. There was no malformation of the lips or palate. The pharynx was of normal configuration, but slightly constricted at its junction with the œsophagus, which consisted of two portions—an upper part, which communicated with the pharynx, and a lower portion, which, originating from the stomach, passed upwards and terminated in the trachea.

The upper portion of the œsophagus terminated in a blind extremity two centimetres and a half below its origin. The whole of this portion of the gullet was hypertrophied, so that it measured three centimetres in circumference.[1]

Ascending from the stomach, the lower end of the œsophagus passed upwards in the usual manner, but three and a half centimetres above the diaphragm its muscular fibres suddenly became thinner and paler, and the tube becoming smaller, terminated in the trachea immediately beneath the lower end of the upper division of the gullet. The connection between the two parts of the œsophagus was maintained by a narrow muscular fasciculus, which passed from the upper extremity of the inferior portion to the under surface of the upper part, and by a thin membranous expansion, which intervened between the two portions. On dividing the trachea vertically in front, the lower part of the upper portion of the œsophagus was seen to form a distinct projection on the posterior wall of the trachea, considerably diminishing the antero-posterior diameter of the latter tube. Situated transversely on the posterior wall of the trachea, at a point just below the level of the lower end of the upper section of the œsophagus, was a minute crescentic opening, directed downwards and backwards, which led into the lower portion of the œsophagus. The rectum was normal.

---

[1] The ordinary circumference of the œsophagus at birth is from one and a half to two centimetres, but it seldom exceeds eighteen millimetres.

Congenital Dilatations and Stenoses.—As, in consequence of symptoms not manifesting themselves till later in life, it is often impossible to determine whether certain dilatations or stenoses are congenital or acquired, it has been thought

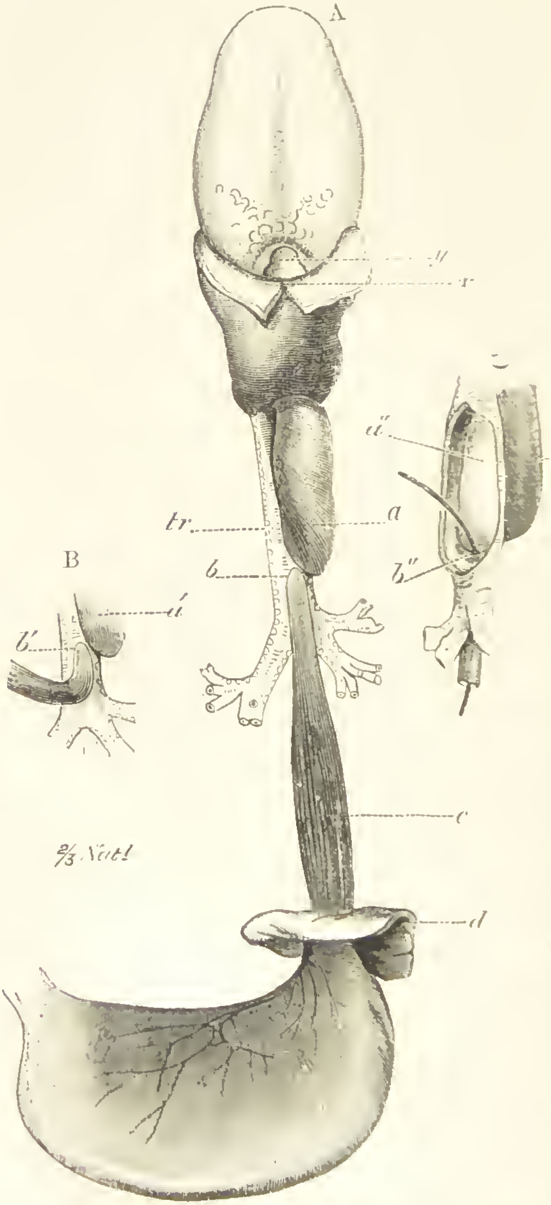

FIG. 22.—CONGENITAL MALFORMATION OF THE ŒSOPHAGUS.

A.—The tongue, pharynx, trachea, imperfect œsophagus, and stomach. *a*, the upper portion of the œsophagus; *b*, the termination of the lower portion of the œsophagus in the trachea; *c*, the lower fourth of the œsophagus which is seen to be well developed; *d*, a small remnant of the diaphragm; *tr*, the trachea; *x*, the upper part of the pharynx, cut in the middle and turned down; *y*, the epiglottis. B. Fragmentary illustration showing the posterior surface of the trachea and the two terminations of the œsophagus, where the abnormality exists. The upper extremity of the lower portion of the œsophagus, *b′*, is thrown on one side, in order to show that it has no connection with the trachea, except just at the point where inter-communication takes place; the relation of the lower extremity, *a′*, of the upper portion of the œsophagus is also distinctly shown. C.—The lower portion of the trachea divided in front by a vertical incision, with its two sides widely separated. *a* is the œsophageal pouch; *a″* shows the indentation in the posterior wall of the trachea caused by the pouch; *b″* is the opening between the trachea and the upper extremity of the lower portion of the œsophagus; a piece of twine is seen passing from the trachea into the œsophagus, which has been (diagrammatically) divided in order to show the passage of the twine.

better to treat those conditions as diseases rather than malformations. The dilatations which probably depend on some congenital weakness have been considered at page 115, and stenoses of probably congenital origin at page 156.

POST-MORTEM SOFTENING OF THE GULLET.

Just as softening, and even perforation, of the stomach sometimes occurs as a result of the action of the gastric juice, so likewise a similar process occasionally takes place in the gullet after death. This is much more rare, however, in the œsophagus than in the stomach, as the former is but seldom exposed to the action of the solvent. It has long been a moot question whether the softening takes place during the last hours of life or only after death; and, in spite of the patient consideration which has been given to this point by Budd,[1] Canton,[2] Ziemssen,[3] and others, the problem is not yet absolutely decided.

The chief factors in post-mortem solution of the gullet are, first, the presence within its channel for a considerable time of gastric juice which retains its normal acidity; secondly, a proper degree of temperature (90° to 100° Fahr.); thirdly, the absence of resistance in the tissues themselves to the digestive power of the fluid—a resistance attributed by Hunter to the influence of the "vital principle," and by modern authorities, with some probability, to the neutralization of the acid of the gastric juice by the presence in the living tissues of a large quantity of alkaline blood. In the majority of cases where softening of the gullet has been observed the stomach has also been more or less destroyed. Post-mortem solution is much more common in the bodies of young children than in the case of adults, but I am not aware that any explanation of this fact has been offered. The degree of maceration of the tissues varies from mere erosion of the epithelial layer, either in small patches or in longitudinal strips corresponding to the folds of the lining membrane of the tube, to complete perforation of the entire thickness of the gullet wall over a greater or lesser area. Intermediate stages of the process have been noted where, in addition to the stripping off of the epithelium, the denuded mucous membrane had a whitish sodden look, as if it had been steeped in spirit. All these degrees of digestive solution may sometimes be observed in the same specimen. When perforation has taken place the œsophageal wall may present one or more irregular rents, or it may be fissured in a longitudinal direction; the edges of the apertures in either case being ragged, and fringed with flocculent shreds of half-dissolved tissue. In some instances the œsophagus is destroyed throughout its whole circumference, but usually the digestive action is confined to the posterior wall. The reason of this is no doubt to be found in the fact that the body has been lying in the supine position. In no recorded case, so far as I am aware, has the action been seen to have extended above the lower half of the gullet. The wall of the œsophagus in the neighbourhood of the softened parts is generally quite normal in appearance, but the vessels of the contiguous mucous membrane are sometimes congested, and even patches of ecchymosis have been observed. In two cases reported by Hoffmann[1] the mucous membrane of the gullet was saturated with extravasated blood.

---

[1] "Croonian Lect."—"London Med. Gazette." 1847, vol. xxxix. p. 896, et seq.

[2] "Lancet," October, 1859.

[3] "Cyclopædia of the Practice of Medicine," vol. viii. p. 89, et seq.

Where the wall of the gullet has been eaten through, the solvent action of the gastric juice is found to have extended to the neighbouring parts. One or both pleural cavities are seen to have been laid open by the destruction of the portion of the parietal layer of the membrane lying nearest to the point of perforation in the œsophagus; and gastric juice with shreds of undigested food, mixed, in some instances, with blood-stained fluid from maceration of the adjacent lower lobe of the lung, may be found in the thorax. There is generally, moreover, some emphysematous distension of the areolar tissue in the posterior mediastinum. It will not unfrequently be found that only one pleural cavity has been opened, and in such cases it is almost invariably the left that communicates with the hole in the gullet.[2] The cause of this will be apparent, when it is remembered that the lower end of the œsophagus lies to the left of the vertebral column, and therefore in closer proximity to the left pleural sac than to its fellow.

---

[1] "Virchow's Archiv." Bd. xliv. p. 352. Ibid. Bd. xlvi. p. 124.

[2] A case, however, has lately been reported by Quincke ("Deutsches Archiv für klin. Med." 1879, vol. xxiv. p. 72), in which the right pleural sac alone was perforated.

It is probable that similar changes may take place in the gullet when life is at its lowest ebb, especially when the approach of death is very slow and gradual, as in persons enfeebled by long wasting maladies. In such cases the conditions already described as necessary for the process of what may be called "self-digestion," come into play. Long continuance in the horizontal position and atony of the muscular walls of the gullet are likely to favour regurgitation of the acid contents of the stomach beyond the cardiac orifice, whilst the feeble circulation of impoverished blood leaves the tissues exposed to the digestive power of the gastric juice. Although this theory is very plausible, no positive proof of its soundness can be given; nor is this a matter of any practical importance, for the recognition of digestive solution of the œsophagus, when the patient is *in articulo mortis*, can lead to no result.

From statistics given by Ziemssen,[1] there seems to be some connection between softening of the gullet and certain diseases of the brain. He affirms that in 2,587 autopsies made at the Pathological Institute at Erlangen, from 1862 to 1876, softening and perforation of the gullet were found in nine cases. In one of these the head was not examined, but in each one of the other eight cases there was (in addition to pathological changes elsewhere) some lesion of the brain. In four of them there was inflammation of the membranes at the base of the brain, together with acute hydrocephalus; in one there was an enormous congenital hydrocephalus; in one there was a cicatrix in the striate body, with slight chronic hydrocephalus; in one great congestion of the brain, with slight hydrocephalus, and in one moderate congestion, together with some œdema of the brain. The ages of these patients ranged from three months to fifty-eight years. Whether wider observation would confirm these statistics it is of course impossible to say, but the simultaneous presence of pressure on the cerebral substance and digestive solution of the gullet in *all* the cases examined, certainly seems to suggest a relation of cause and effect between the two conditions.

---

[1] Op. cit. p. 104.

SECTION V.—THE NOSE.

ANATOMY OF THE NASAL FOSSÆ.

THESE intricate cavities are bounded *above* by the under surface of the anterior third of the base of the skull, *below* by the upper surface of the hard palate, *externally* by the wall of the orbit and by the superior maxillary bone, whilst *internally* the two nasal chambers are separated from each other by a perpendicular septum, in part bony and in part cartilaginous. In front the nasal fossæ open into the cavities of the nostrils or *vestibula nasi* (hereafter described, p. 243) by two oval apertures—the anterior nares—placed in the vertical plane, and inclined very nearly at right angles to the external orifices of the nostrils. Posteriorly they communicate with the upper part of the pharynx by the posterior nares or *choanæ*, two quadrilateral openings looking backwards and somewhat downwards. Each nasal cavity may be described as an irregular four-sided passage, of somewhat pyramidal form. Of this passage the upper wall or roof is horizontal in its middle third, but inclines abruptly downwards both in front and behind; the lower wall or floor is almost horizontal, having only a slight inclination downwards and backwards, whilst the external and internal walls are, roughly speaking, vertical and parallel to each other.

The roof is formed, in its horizontal portion, by the cribriform plate of the ethmoid bone, and constitutes, for a limited space, the immediate floor of the brain. In its anterior portion it is made up of the nasal process of the frontal and the nasal bone proper, its downward inclination gradually increasing from behind forwards. The posterior third of the roof, which is inclined almost at right angles to the horizontal portion, is formed by the body of the sphenoid bone, being continuous behind with the basilar process of the occipital.

The floor of each nasal cavity is composed anteriorly of the palatine process of the superior maxilla, and posteriorly of the horizontal plate of the palate bone. It is slightly hollowed out from side to side, and presents anteriorly the orifice of the nasal canal.

The internal or median wall, constituting the *septum narium*, is roughly quadrilateral in outline, and after the seventh year is generally inclined to one side or the other, thus slightly enlarging one cavity at the expense of its neighbour. In many cases, however, this lateral deflection of the nasal partition is sufficiently pronounced to cause serious obstruction in one of the nasal passages, a deformity which will be subsequently considered under the head of "Deviations of the Septum."

The septum of the nose is formed behind by the vomer and perpendicular plate of the ethmoid, and in front by a vertical cartilaginous plate received into the angle of junction between these bones. The inner edge of the palatal process of the superior maxillary bone and of the palate bone itself rises on the upper aspect into a crest which forms a slight bony ridge along the middle line of the floor of the nose when the bones of both sides are in apposition. This ridge is the base of the nasal septum.

The external wall of each cavity is placed almost vertically, but with a slight inclination downwards and outwards. In its upper part it is formed by the frontal process of the superior maxilla, the lachrymal bone, and the orbital plate of the ethmoid; in its lower part by the inner surface of the body of the superior maxilla, the perpendicular plate of the palate bone, and the internal pterygoid plate of the sphenoid. The surface of the outer wall is, however, rendered uneven by the turbinated bones which form projections in the nasal cavity, leaving intervening spaces between them which are called meatuses.

There are always three turbinated bones, and frequently a fourth. Each one is formed of a thin lamina, somewhat triangular in shape, perforated by numberless minute openings, and so curved upon itself as to present a convexity upwards, inwards, and slightly forwards. The three turbinated bones spring from the lateral walls of the nasal cavity, at about equal distances from each other, their margins of attachment being horizontal and nearly parallel, while their free incurved margins are convex, so that each bone is widest at its centre. The posterior extremities of their attachments are placed nearly in the same vertical line, and as each bone is longer than the one above it the anterior extremity of the inferior bone approaches nearer to the anterior nares than that of the middle bone, and this, again, is very considerably in advance of the anterior extremity of the upper bone. Examining the turbinated or spongy bones more in detail, it will be seen that the inferior one is the most developed and the most compact in structure, and that it is the only one which is an independent bone. It varies in length from twenty-five to fifty millimetres, and in breadth from five to fifteen. It articulates with the superior maxilla, its anterior pointed extremity coming into relation with the anterior portion of the nasal process of that bone, while its posterior rounded extremity extends to the internal pterygoid process. The middle and superior bones are merely processes of the ethmoid, and though separated behind they are united together in front. The middle spongy bone is more rolled round at its centre than at its extremities. Near its anterior free end a small projection—the *agger nasi*[1]—is directed inwards, and on the corresponding level of the septum there is a slight bulge. These two minute protuberances make a faint line of demarcation between the olfactory region above and the respiratory passage below. Above the middle spongy bone is the superior one, and this, again, by a horizontal slit in its posterior edge, is often divided, so that there is, in fact, a fourth turbinated bone, which is still shorter than the one below it. The existence of the fourth bone was first pointed out by Santorini,[2] and, according to Zuckerkandl,[3] it is present in more than one-third of all cases.

By the projection of the turbinated bones each nasal cavity is broken up into three passages or meatuses, communicating internally with that remaining narrow portion of the fossa where nothing is interposed between the roof and the floor. The uppermost of these passages, the superior meatus, is limited by the upper and middle turbinated bones and by that portion of the external wall included between them; it communicates by means of a foramen with the posterior ethmoidal cells, and through them with the sinuses in the body of the sphenoid. When there is a fourth spongy bone, there is also a fourth meatus. The middle meatus is situated between the middle and inferior turbinated bones. It communicates above with the anterior ethmoidal cells, and on its outer wall is a crescentic opening—the *hiatus semilunaris*, or ethmoidal fissure—about two centimetres in length, the convexity of the crescent being directed forwards and downwards. The curve of the unciform process of the ethmoid bone forms the lower boundary of the hiatus semilunaris, the upper edge being constituted by the lower surface of the ethmoidal cells. One of the ethmoidal cells bulges outwards opposite the middle of the unciform process, giving rise to a prominence which has been called by Zuckerkandl[1] the *bulla ethmoidalis*. The hiatus semilunaris leads to a funnel-shaped cavity—the infundibulum—which communicates at its upper and anterior part with the frontal cells, and at its lower and posterior part by the *ostium maxillare* with the antrum of Highmore. Immediately behind the hiatus semilunaris there is also often a small additional opening into the antrum[2]—the *ostium maxillare accessorium*. The inferior meatus runs between the lower turbinated bone and the floor of the nasal cavity. In the anterior part of the meatus, at the articulation of the turbinated bone with the nasal process of the superior maxilla, is situated the orifice of the lachrymal duct.

---

[1] H. Meyer: "Lehrb. d. phys. Anat." Leipzig, 1856.

[2] "Observ. Anatom." Venetiis, 1724, cap. v. p. 89.

[3] "Anatomie der Nasenhohle." Wien, 1882, p 31.

Each nasal fossa is, as already remarked, continuous in front with the cavities of the nostril, or *vestibula nasi*. Here, however, the bony framework gives place to cartilaginous plates. These, though subject to variations in form and number, consist in their simplest development, of three distinct cartilages, one median and two lateral. The former, by means of its rhomboidal perpendicular plate, helps to complete the septum narium, and supports the bridge of the nose below the nasal bones. The portion of its anterior border which serves the latter purpose is broad and grooved, while the part above it is applied to the suture between the nasal bones, and that below it is bent abruptly backwards to terminate at the anterior nasal spine. Attached at an acute angle to the broad and grooved portion are two lateral plates which, together with the lateral cartilages proper, serve to support the outer walls of the cavities of the nostrils. Each of these lateral plates is triangular in form, and is attached above to the sharp margin of the nasal bone, whilst its lower margin is free and somewhat incurved, so as to make a slight projection inside the nostril. The lateral cartilages proper support the outer and a small part of the inner walls of the nostrils. They consist of two segments united together at an acute angle. The larger portions, roughly triangular in shape, slightly overlap the lateral plates of the median cartilage and form the framework of the *alæ nasi*. The smaller portions give support to the septum between the nostrils, filling up the space left by the retreating border of the perpendicular plate.

The interior of the nasal cavities is lined throughout by mucous membrane, which is continuous in front with the skin of the face and posteriorly with the mucous lining of the pharynx. It varies considerably in character in different parts, but in its general arrangement it follows pretty closely the ramifications of the bony framework. It consists of two layers, a deep fibrous, and a superficial mucous stratum which is covered by epithelium. The deep layer forms the immediate covering of the skeleton of the nose, having the functions of periosteum over the bones, and of perichondrium over the cartilaginous parts. It is somewhat loosely attached to the cartilages, but in other parts is firmly adherent. This membrane has been shown by Panas[1] to be much thicker and more fibrous at the upper and posterior part of the septum and the immediately adjoining space on the base of the skull than at any other part. The superficial layer of the mucous membrane may be roughly divided, according to its histological character and physiological functions, into two portions—a superior, or olfactory, and an inferior, or respiratory, tract. In the former the membrane is thin and closely adherent to its deep layer or periosteum ; it is not very vascular, but is of a palish brown colour from the presence of pigment in the epithelium and the glands. The epithelium is of the columnar variety, but without cilia, and lying amongst the columnæ are the peculiar rod-shaped bodies known as the *olfactorial cells* of Schulze. The blood-supply of the olfactory region comes principally from the anterior ethmoidal and the nasal branches of the posterior ethmoidal arteries, whilst the nerves are the terminal twigs of the olfactory itself, which, after passing through the aperture in the cribriform plate of the ethmoid, is distributed to the roof and to the inner and outer wall of the nasal cavity in the upper third. In the respiratory tract the deep is separated from the superficial layer of the mucous membrane by some connective tissue which gives support to the numerous vessels and capillaries supplied to this part. Anteriorly the latter approximates in character to the external skin, its epithelium being tesselated and disposed in layers, while just within the nostrils it is provided with hair-sacs and sebaceous follicles. The tesselated epithelium not only covers the whole of the mucous membrane which has a cartilaginous framework, but extends as far back as the anterior extremity of the lower turbinated bone. The remainder of the respiratory tract is furnished with columnar ciliated epithelium, the cilia of which vibrate towards the posterior nares. The nervous supply of this portion of the nasal passage is mainly derived from offshoots of Meckel's ganglion. In the neighbourhood of the foramina, by means of which the nasal cavities communicate with the adjacent sinuses, the mucous membrane does not exactly follow the contour of the bony framework, but presents folds, which deserve a brief mention. Thus, in front of the chink-like opening by which the anterior ethmoidal cells open into the middle meatus, the mucous membrane is raised into a fold to form a groove, which corresponds to the fissure in the bony skeleton, already described as the hiatus semilunaris, and considerably increases the depth of that cavity. The mucous membrane of the antrum is also occasionally continuous with that of the middle meatus by means of a small circular accessory opening placed just above the attachment of the inferior turbinated bone, near the posterior extremity of the hiatus semilunaris. In the inferior meatus the shape of the outlet of the lachrymal duct is considerably modified by the disposition of the mucous membrane around it. In the recent state this orifice is sometimes circular in form and sometimes elongated, either in a vertical or transverse direction, whilst the mucous membrane is occasionally arranged so as to make a groove below the opening. On the floor of the nasal cavities the mucous membrane dips down into the naso-palatine foramina, which are situated one on each side of the septum at about half an inch from the anterior nares, being sometimes continuous through these openings with the mucous covering of the hard palate.

---

[1] Op. cit. p. 36.

[2] According to Zuckerkandl (op. cit. p. 22) this accessory foramen was found in every ninth or tenth cranium which he examined.

---

[1] "Bull. de la Soc. de Chir." July 9, 1873.

The mucous membrane covering the turbinated bones is crowded with glands, the openings of which may be readily seen upon its surface, though the glands themselves are deeply imbedded in the sub-epithelial structures. On the other hand, the glands in the membrane covering the septum are small in size and few in number.

The arterial supply of the nasal fossæ is derived from two sources, viz., the posterior nasal branch of the internal maxillary, and the anterior ethmoidal branch of the ophthalmic. The former enters at the spheno-palatine foramen and divides into two branches: a lateral, passing off behind the turbinated bones and supplying the adjacent structures, and a median branch supplying the septum and forming an anastomosis with the septal branches of the anterior ethmoidal. The latter artery, besides supplying the anterior portion of the septum, also sends branches to the lateral portions of the fossæ. All the above arteries contribute to form a dense capillary network, which is most developed beneath the mucous lining of the respiratory tract. The veins of the nasal cavities, as a rule, accompany the arteries, but are larger and more numerous. They communicate chiefly with the facial and ophthalmic veins, but also pass through the cribriform plate of the ethmoid, and in young subjects send branches through the foramen cæcum, the superior longitudinal sinus, a few twigs not unfrequently, indeed, terminating in the coronary sinus. The veins over the turbinated bones, between the periosteum and the mucous membrane, were first shown by Kohlrausch[1] to form a "cavernous network," and soon afterwards a more detailed description of this structure, with highly artistic illustrations, was given by Bigelow,[2] who demonstrated the truly erectile character of the structure. Voltolini[3] pointed out that each turbinated bone, in spite of its extremely delicate structure, can, after maceration, be seen to be perforated by countless minute holes. Through these openings small vessels pass, and they perforate the bone in such abundance that in a space of three square millimetres ten patent vessels have been counted. The soft parts are closely adherent to the elevations and depressions of the periosteum, covering the bone, as Voltolini says, just as a sponge does the hard coral beneath it. The cavernous network, with its bony support and investing mucous membrane, constitutes the "turbinated bodies."

The lymphatics form a very superficial network, and terminate in two trunks which pass close to the openings of the Eustachian tubes to join glands in the lateral wall of the pharynx.

The nerves are of two kinds—those of general and those of special sensation. The former consists of the spheno-palatine branch of the second division of the fifth, and of the vidian nerve which supplies the upper and back part of the septum; of the nasal branch of the ophthalmic which ramifies on the upper and interior part of the septum and the upper portion of the external wall; of the naso-palatine nerve which supplies the middle part of the septum; and of the anterior palatine nerve which is distributed to the middle and inferior turbinated bodies. The nerve of special sense is the olfactory, the filaments of which, after passing through the foramina in the cribriform plate of the ethmoid, are distributed to the upper third of the septum, and to the superior and middle turbinated bodies. Some filaments of the sympathetic can also be traced in the nasal mucous membrane.

---

[1] "Muller's Archiv." 1853 p. 149.
[2] "Boston Med. and Surg. Journ." April 29, 1875.
[3] "Monatsschrift fur Ohrenheilkunde." 1877, No. 44.

RHINOSCOPY.

The nose can be examined by three methods. Thus, 1st, a speculum may be passed into the nares, and a large portion of the anterior part of the nasal cavity thereby brought into view; 2ndly, the upper and central parts of the nose can be sometimes inspected by means of a small mirror introduced along the floor, with its reflecting surface directed obliquely upwards; and 3rdly, the hinder portion of the nose and the posterior nares themselves can be seen by placing a mirror at a suitable angle behind the uvula. Hence *anterior rhinoscopy, median rhinoscopy, and posterior rhinoscopy* may be practised.

ANTERIOR RHINOSCOPY.

History.—From a very early period in the history of medicine attempts were no doubt made to inspect the interior of the nasal fossæ by throwing back the patient's head, and tilting the tip of the nose upwards with the finger. A nasal speculum was described and figured by Dionis[1] at the beginning of last century; it was simply a dilating instrument, and was recommended by the inventor chiefly as part of the apparatus required for the removal of polypi. In modern times Markusovzsky seems to have been the first to attempt a regular examination of the nasal cavity by means of a speculum, and in 1859, whilst on a visit to Pesth, I had an opportunity of seeing his instrument, which appeared to be a modification of Kramer's ear speculum. In 1860 Czermak[2] expressed his appreciation of it. Soon afterwards Voltolini[3] stated that he was able to see the Eustachian cushion by passing an ear speculum into the nose. Subsequently he showed[4] that by dilating the nasal passages in a good light the pharyngeal wall could be easily seen, and that this was particularly the case in ozæna, when there was atrophy of the turbinated bodies. In 1868 Thudichum[5] described a speculum for examining the anterior nares, whilst in the same year Duplay[6] devised an excellent instrument for the inspection from the front of the deeper parts of the nose; to this method he gave the name of *anterior rhinoscopy.* In 1872 Fränkel[7] published an account of his admirable speculum, hereafter described. In 1873 Michel[8] stated that he was often able, by means of Duplay's speculum, to see the posterior half of the Eustachian orifice, and the whole of its cushion, and that he could perceive the movements of the tube in phonation and swallowing.

---

[1] "Cours d'Opérations de Chirurgie." Paris, 1714, 2e éd. p. 483, and Fig. 37 E.

[2] "Wien. med. Wochenschrift." 1860, No. 17.

[3] "Die Rhinoscopie und Pharyngoscopie." Festschrift zur 50 jährigen Jubelfeier der Universität Breslau zum 3 August, 1861.

[4] "Monatsschr. für Ohrenheilkunde," No. 3, 1868.

[5] "Lancet." 1868, vol. ii. pp. 243, 244.

[6] "Bull. de la Soc. de Chir." 1868, 2e série, t. ix. p. 446.

[7] "Berlin. klin. Wochenschrift." 1872, No. 6.

[8] Ibid. 1873, No. 34.

A new departure was given to rhinoscopy, carried out from the front, by Zaufal,[1] who, in 1875, first recommended the use of a funnel-shaped speculum, long enough to pass completely through the nasal cavity. Notwithstanding that the merit of this method has been contested by Weber-Liel, Gruber, Schrötter, and Voltolini, it is undoubtedly of value, and Habermann,[2] a pupil of Zaufal's, has recorded a very large number of cases in which the funnel-speculum has been employed with much advantage.

[1] "Aerztliches Correspondenz-Blatt aus Böhmen," 1875. See also "Archiv fur Ohrenheilkunde," Band xii. Viertes Heft, 1877.
[2] "Wien. med. Presse." 1881, Nos. 23, 24, and 25.

Nasal Specula.—For ordinary examination of the front part of the cavities Fränkel's speculum will be found most serviceable. This instrument consists, as may be seen in the annexed woodcut (Fig. 23), of two fenestrated blades.

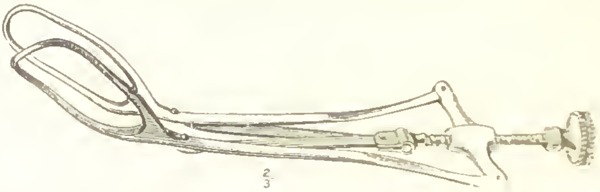

Fig. 23.—Dr. Fränkel's Nasal Speculum.

made of German silver wire, two and a half centimetres in length, and somewhat resembling miniature obstetric forceps, but with shanks about five centimetres in length. The proximal extremities of the shanks are connected by a horizontal bar, through which there is a central screw acting on both blades. Fränkel recommends that one blade of the instrument should be introduced into each nostril, but mentions that both blades may be passed into a single nostril, and I prefer this plan. By turning the screw the blades are gradually separated, and a good view of the interior of the nose is obtained. When the blades are sufficiently opened to press slightly on the nasal alæ, the instrument becomes self-retaining, and the lower part of the speculum falling in front of the lip causes no obstruction to the sight. The great advantage of this instrument consists in its affording an excellent view, whilst causing no pain, and scarcely any inconvenience to the patient.

Von Tröltsch[1] has taken the screw arrangements of Fränkel's instrument, and replaced the wires by two solid blades,

[1] "Lehrbuch der Ohrenheilkunde." Leipzig, 1877, p. 317.

each three centimetres in length, but I have not found this speculum so convenient as Fränkel's.

Another speculum, the blades of which somewhat resemble those of Fränkel's, has been recently invented by Goodwillie,[1] of New York. The instrument is kept open by the elasticity of the wire which connects the two blades. With it, however, it is impossible to regulate the separation of the blades so accurately as with Fränkel's, and hence no fewer than five specula are needed to suit the varying sizes of the nasal orifices. Creswell Baber,[2] of Brighton, uses a speculum (Fig. 24), which consists of two little curved wires, kept in position by a band passing round the head. Spencer Watson[3] employs a modification of Noyes's eye speculum attached to a frontal band worn by the patient. I do not think, however, that either of these instruments is so convenient as Fränkel's. Thudichum's speculum (Fig. 25) consists of two flat blades united together, and at the same time kept apart by means of a piece of elastic wire. The objections already mentioned in speaking of Goodwillie's instrument apply to that of Thudichum; besides which, it so often hurts the patient that I have now quite given up its use.

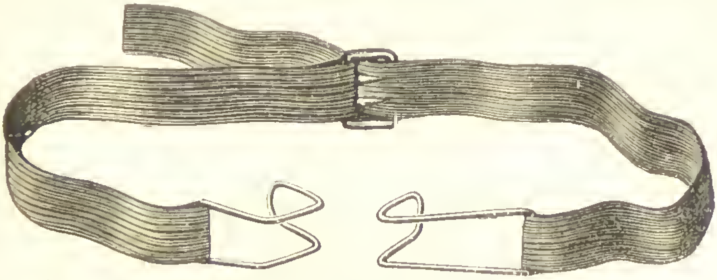

FIG. 24.—DR. CRESWELL BABER'S NASAL SPECULUM.

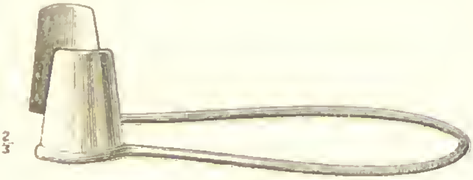

FIG. 25.—DR. THUDICHUM'S NASAL SPECULUM.

---

[1] Bosworth: "Diseases of the Throat and Nose." New York, 1881, p. 23.

[2] "Brit. Med. Journ." 1881, vol. i. p. 55. The instrument is made by Messrs. Wright, of 108, New Bond-street.

[3] "London Specialist." 1880, vol. i. No. 1.

For examining the deeper parts of the nose Duplay's speculum, which is a hollow cone-shaped bivalve instrument (Fig. 26 A), is of the greatest service. The two blades of the instrument are slightly flattened, so that the distal end is somewhat beak-shaped, but the inner

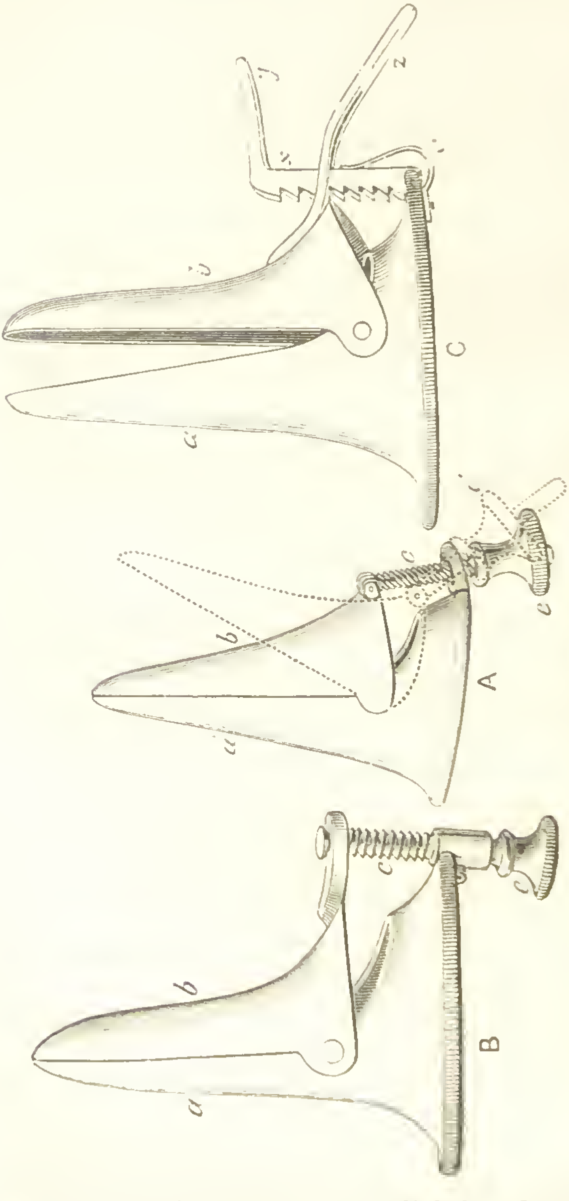

FIG. 26.—NASAL SPECULA.

A.—Duplay's speculum: *a* and *b*, the two blades; *c*, male screw; *e*, handle of running screw. The dotted lines show the position of the instrument when fully open. B.—Schmister's speculum: *a* and *b*, the two blades; *c*, handle of male screw; *c*, male screw. C.—Voltolini's speculum: *a* and *b*, the two blades; *x*, rack; *e*, small spring for keeping *x* in position. When *y* and *z* are held together, the instrument is kept closed, and by pressing on *z* it is opened.

blade (intended to be applied against the septum) is more flattened than its fellow. The outer blade is movable in the distal four-fifths of its length, and when pulled open is fixed in position by means of a *running* screw (Fig. 26 A, *e* and *e'*). Its full size is shown in Fig. 26 A, and no larger instrument is ever required, and can seldom be tolerated. It will be seen that the blades open very widely.

Schuster, of Aix-la-Chapelle, has modified Duplay's speculum by employing a *fixed* instead of a running screw (Fig. 26 B). The instrument is rather too large, and yet does not open so widely as Duplay's; but the blades can be opened more gradually, and are thus less likely to hurt the patient. Voltolini (Fig. 26 C) has also modified Duplay's arrangement for opening the speculum, by adapting a rack movement to it, but I have not found this at all convenient, and the instrument is apt to cause a good deal of pain. Massei[1] again has varied Duplay's speculum, by fenestrating one of the blades, and under some circumstances this instrument is very useful.

Elsberg has invented a trivalve speculum (Fig. 27) by means of which the interior of the nose can be thoroughly inspected. The three blades are separated by closing the handles, or may be more gradually separated by means of a screw in the shank of the instrument. This speculum however, has the disadvantage of not being self-retaining,

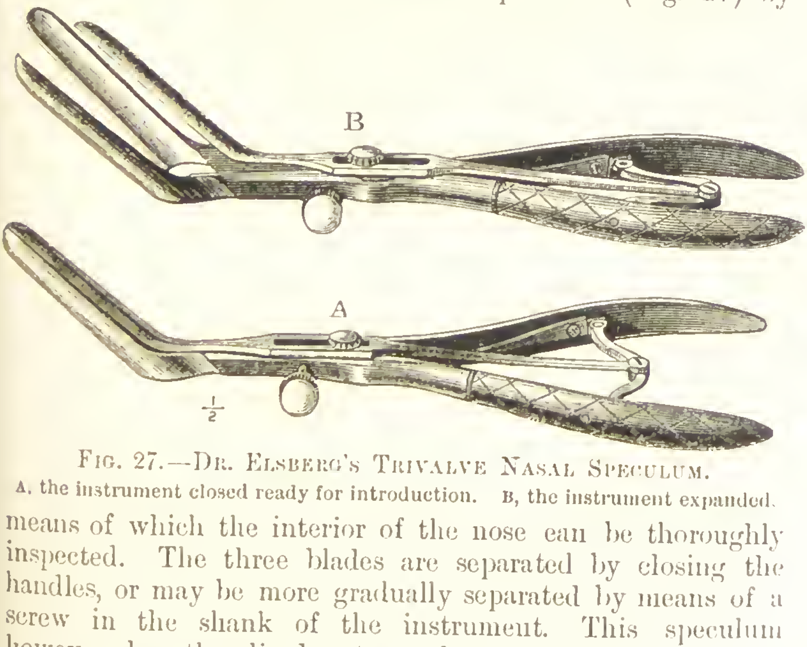

FIG. 27.—DR. ELSBERG'S TRIVALVE NASAL SPECULUM.
A, the instrument closed ready for introduction. B, the instrument expanded.

---

[1] "Malattie del tratto respiratorio." Napoli, 1882, p. 178. The instrument was described and figured in a paper read before the Royal Med.-Chir. Society of Naples on the 30th May, 1875.

and though I occasionally use it, I much more frequently employ one of those previously described. Schnitzler[1] recommends Roth's modification of Kramer's aural instrument further altered by the fenestration of each blade.

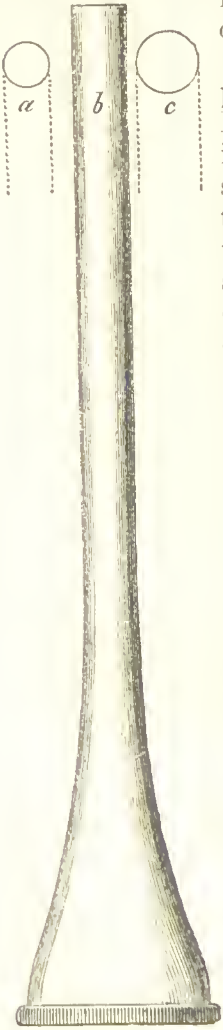

Fig. 28.
Zaufal's Funnel.
b shows the size most frequently used; *a* and *c* are sections of tubes of smaller and larger bore.

For examining the posterior wall of the pharynx and the neighbourhood of the Eustachian tube Zaufal's funnel (Fig. 28) is very useful. The instrument is well described by its name, as it is nothing more than a perfectly cylindrical metallic tube, widening at its proximal end into a funnel-shaped mouth. The length of the cylindrical portion of the speculum is from six to eight centimetres, that of the funnel is three centimetres, and total length of the instrument being therefore from nine to eleven centimetres. The diameter of the proximal end is about two centimetres. The instrument is made in five different sizes, the smallest one (called No. 3) having a diameter of three millimetres at its distal extremity, the next (No. 4) a diameter of four millimetres, and the others having diameters of five, six, and seven millimetres respectively. There is no canula with a diameter of either one or two millimetres, as the lumen of such instruments would be too small to permit of satisfactory observation. The range is therefore from No. 3 to No. 7, both numbers inclusive, and of these Zaufal himself most frequently employs Nos. 6, 5, and 4. The interior of the funnel-shaped mouth is blackened, whilst the cylindrical portion of the instrument has a polished inner surface. Zaufal at first used a pilot sound for passing the speculum through the nose, but has now discarded this. It may be added that he employs the instrument not only for diagnostic, but also for operative, purposes. In the latter case he chooses, if possible, the largest tube, which serves, in fact, as a canula through which he introduces tube-forceps or snares. I have used Zaufal's funnels in a good many instances, but more for the purpose of experiment than with a clinical object. I have, however, fully convinced myself of the possibility of making observations in a considerable proportion of cases. Voltolini,[1] though strongly objecting to Zaufal's instruments, has latterly made use of short funnels varying in length from four to seven and a half centimetres with a lumen of from five to eight millimetres. In connection with these he employs Brunton's otoscope.[2]

---

[1] "Laryngoscopie und Rhinoscopie." Wien, 1879, p. 59.

Illumination.—For anterior rhinoscopy a good light is required. Sunlight may be employed if it is available, but as this is unfortunately rarely the case in this country, it is better to have some artificial means of illumination. Any of the arrangements for this purpose, which have been already described (see Vol. i. pp. 218—224), may be used.

THE APPLICATION OF ANTERIOR RHINOSCOPY.

The operator should wear a perforated concave reflector supported by a spectacle frame or frontal band (Vol. i. p. 218), whilst the patient should sit upright opposite him. A good lamp being fixed near the patient's head on the same side as that on which the surgeon wears the reflector, and the nose being tilted up, the vestibule comes into view. This is an irregularly oblong cavity, the outer wall of which (corresponding to the lower two-thirds of the lateral cartilage) extends farther back than the inner, which is formed by the inner returning portion of the lateral cartilage. This space is lined with common integument, and on it grow numerous short coarse hairs, which protect the entrance of the nose. At the upper end of the vestibule is the opening of the anterior nares, the inner, upper, and outer borders of which are sharply defined. On introducing a speculum and separating its blades, the interior of the nostrils comes into view, together with the anterior extremity of the inferior turbinated body and a part of the cartilaginous portion of the septum. If the patient's head be very slightly bent forwards, the observer can trace the inferior turbinated body backwards, its outer convex surface and lower border being often visible throughout. Between the free edge of this body and the floor of the nose is the inferior meatus, the height of which is rather less than the distance between the upper and lower borders of the inferior turbinated body. A ray of light can generally be projected into the anterior half of the inferior meatus, but seldom beyond this point; and not unfrequently, owing to a slight twist *inwards* of the front part of the turbinated body, especially at the point where its anterior and inferior borders meet, only the anterior fourth of the lower meatus is visible. On inclining the patient's head backwards, the lower border and the inferior portion of the inner convex surface of the middle turbinated body come into view, whilst a small portion of its outer concave part can sometimes be seen. The superior turbinated body can occasionally be observed quite at the back and near the vault of the nose, but this is the exception. I have never been able to distinguish the superior meatus from the front. If the patient throws his head very much forwards, the floor of the nose can often be followed to the posterior extremity. It is almost always uneven, and frequently presents small irregularly rounded eminences.

---

[1] "Rhinoscopie und Pharyngoscopie." Erste Hälfte, p. 81.

[2] This instrument consists of a metallic tube provided with an eyepiece. Into this tube a funnel opens at right angles, through which the light is made to fall on a perforated reflector, which throws the rays through the distal part of the cylinder into an ordinary ear speculum.

The septum can generally be seen, except its upper sixth and posterior eighth. The partition, as already stated (see Anatomy) is seldom quite symmetrical, being often slightly convex on one side, and correspondingly concave on the other. Even when the septum is straight, irregular projections are often seen, especially at the lower and back part of the vomer. Small exostoses can also often be perceived at the angle where the perpendicular plate of the ethmoid, the vomer, and the cartilage of the septum meet one another.

The colour of the lining membrane of the nose varies in different situations. The anterior border of the inferior turbinated body is, as a rule, bright red, and its inferior convex border is mostly of the same hue. The lower border of the middle turbinated body is generally quite pale, and is indeed less vascular than any other portion of the lining membrane of the nose. The floor of the nasal fossa is of a dull red colour, whilst the surface of the mucous membrane covering the septum is pale red.

On looking directly through the nose whilst the patient's head is inclined slightly forwards, the posterior wall of the pharynx can sometimes be seen; and on directing him to swallow, the cushion of the Eustachian orifice may be observed to move upwards. A better view, however, of the posterior wall and Eustachian orifice can be obtained with Zaufal's funnel.

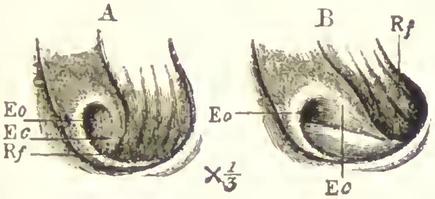

FIG. 29.—THE EUSTACHIAN ORIFICE AS SEEN FROM THE FRONT (AFTER ZAUFAL).

A, the orifice at rest. B, the orifice as seen in deglutition and in certain acts of articulation. Eo, Eustachian orifice. Ec, Eustachian cushion. Rf, Rosenmüller's fossa.

MEDIAN RHINOSCOPY.

Wertheim[1] first suggested the idea of passing into the nose a small tube provided with a steel mirror directed upwards, and a corresponding fenestra at its end, like Avery's laryngoscope, and to this instrument he gave the name of "conchoscope." In order to prevent the mirror from becoming soiled by mucus on its introduction into the nose, Voltolini provided the fenestra with a small shield which could be drawn back by means of a thread when the instrument was in position. Voltolini also substituted glass for steel in the mirrors.

The illumination recommended for anterior rhinoscopy is equally applicable to the median method, but the mode of examination itself is seldom of any practical advantage. I may mention, however, that by this plan I once succeeded in obtaining a view of a small polypus situated just above the anterior extremity of the middle turbinated body, which could not be brought into view by any dilating speculum.

[1] "Ueber ein Verfahren zum Zwecke der Besichtigung des vorderen und mittleren Drittheiles der Nasenhöhle." "Wien. med. Wochenschrift." 1869, Nrs. 18, 19, 20.

POSTERIOR RHINOSCOPY.

History.—The idea of examining the posterior nares by placing a mirror at the back of the mouth, with its reflecting surface directed obliquely upwards, appears to have occurred to Bozzini,[1] Baumès,[2] and others; but the practical application of the method is undoubtedly due to Czermak,[1] and the art of rhinoscopy dates from a paper published by him in August, 1859. In the following year Semeleder[2] made some remarks on the subject, and later on[3] he brought out a small work which contained many useful directions for rhinoscopy, a number of very interesting cases, and some beautiful coloured illustrations. Soon after the appearance of Semeleder's first paper, articles were published by Stoerk,[4] Türck,[5] and Voltolini.[6] To the last-named writer, however, is due the credit of systematically working at the subject for many years, and of having produced the most valuable treatise[7] on rhinoscopy that has yet appeared.

---

[1] "Der Lichtleiter, oder Beschreibung einer einfachen Vorrichtung, und ihrer Anwendung zur Erleuchtung innerer Höhlen, und Zwischenräume des lebenden animalischen Körpers." Weimar, 1807.

[2] "Compte-rendu des Travaux de la Soc. de Méd. de Lyon." 1836-38, p. 62.

The Rhinal Mirror.—A small laryngeal mirror answers the purpose very well. Its reflecting surface should not be more than 1$\frac{7}{8}$ centimetre ($\frac{3}{8}$-inch) in diameter. An excellent rhinoscopic mirror has been invented by W. C. Jarvis, of New York (Fig. 30), which combines a mirror and tongue-spatula in the most simple and convenient manner. Fränkel

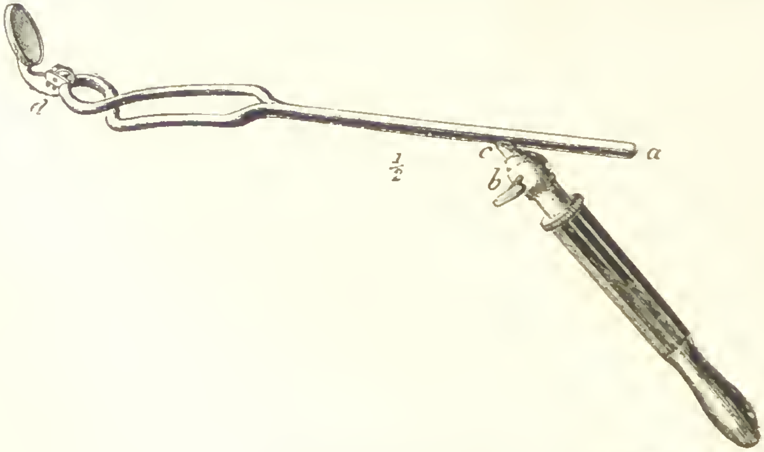

FIG. 30.—DR. JARVIS'S COMBINED TONGUE DEPRESSOR AND POST-NASAL MIRROR.

a, the shank of the mirror; *b*, screw by which the shank is fixed to handle; *c*, descending arm of shank; *d*, spring-joint at which the mirror can be fixed at any angle desired. The handle of the instrument can either be continued in the same line of the shank by fixing at *a*, or it can be secured at an angle by screwing it to *c*, as in the woodcut. The expanded portion of the shank acts as a tongue-depressor.

---

[1] "Wien. med. Wochenschrift," Aug. 6, 1859.

[2] "Ueber die Untersuchungen des Nasenrachenraumes." "Zeitschr. d. Gesellsch. d. Aerzte zu Wien." 1860.

[3] "Die Rhinoscopie und ihr Werth für die ärztliche Praxis." Leipzig. 1862.

[4] "Rhinoscopie." "Zeitschr. d. Gesellsch. d. Aerzte zu Wien." 1860. Nr. 26.

[5] "Beiträge zur Laryngoscopie und Rhinoscopie." "Zeitschr. d. Gesellsch. d. Aerzte zu Wien." 1860, Nr. 21.

[6] "Die Besichtigung der Tuba Eustachii und der übrigen Theile des Cavum pharyngonasale mittelst des Schlundkopfspiegels." "Deutsche Klinik." 1860. Nr. 21.

[7] "Rhinoscopie und Pharyngoscopie." Breslau, 1879.

has devised an instrument in which the mirror is hinged on to the shank, and this again is fixed at nearly a right angle to a wooden handle (Fig. 31). By pushing forward a little bar acting on the hinge the angle of the mirror can be changed after its introduction. Michel[1] has also invented a rotating mirror, in which the movement of the glass is rapidly effected by a spring in the handle of the instrument. The disadvantage of this arrangement is that the mirror has to be kept in the desired position by the constant pressure of the thumb on the spring. I may repeat, moreover, in connection with these various rhinoscopes, that I find the ordinary small-sized laryngeal mirror answer every purpose.

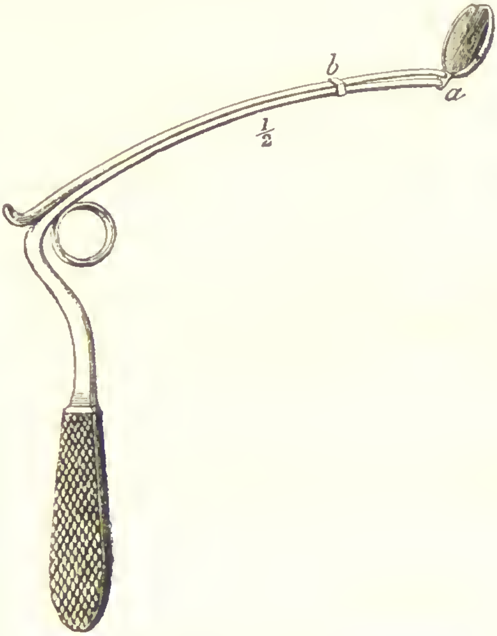

FIG. 31.—FRANKEL'S POST-RHINAL MIRROR.
a, the hinge; *b*, the running bar.

Palate Hooks.—The uvula often causes an impediment to posterior rhinoscopy, and various devices have been suggested for the temporary removal of this obstruction. The first instrument invented for this purpose was the palate hook of Czermak. This instrument[2] (Fig. 32 c) consisted of a metal rod about four inches in length, one end of which was fixed into a wooden handle, whilst the other was widened towards the distal extremity and terminated in a short blunt right-angled hook a quarter of an inch in length. Czermak remarks that the size and curve of the hook must vary according to the proportion of the parts. The value of an instrument of this kind is strongly insisted on by Voltolini,[1] who uses a much larger hook provided with two small wings attached to the distal extremity of the shank, just before the bend (Fig. 32 A). The object of these wings appears to be to form a kind of spoon-shaped cavity which supports the uvula in the middle line, thus keeping it from obstructing the view. An instrument of intermediate size and fenestrated at the upturned part of the blade is used by Fränkel (Fig. 32 B), who also occasionally employs an instrument combining a gag, a tongue-depressor, and a groove to hold his palate-hook. But it is very seldom that such instruments, however ingenious, can be successfully employed, and I may remark that I rarely use even a simple hook.

---

[1] "Die Krankheiten der Nasenhöhle." Berlin, 1876, p. 9.

[2] "Der Kehlkopfspiegel und seine Verwerthung für Physiologie und Medizin." Leipzig, 1860.

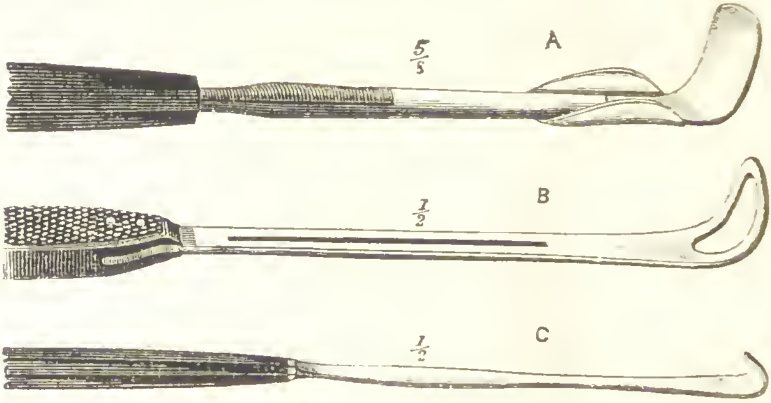

Fig. 32.—Palate Hooks.

A, Voltolini's palate hook ; B, Fränkel's palate hook ; C, Czermak's palate hook.

Voltolini,[2] who, as already remarked, is a strong advocate of the palate hook, attaches great importance to his *mode of using it*, which he describes in the following terms:—"With the index finger of the left hand the patient's tongue should be strongly depressed, and then, without any ceremony or preparation, the hook having been boldly and quickly passed high up behind the uvula, even to the posterior nares, should be drawn forcibly forwards."[1] Voltolini states that he has never met with a patient who could not bear the application of the hook in this way, and he affirms that the uvula yields better to a "forcible grasp than to tender or timid handling." He then proceeds to quote Löwenberg, Monro, Michel, and myself, to show that we all teach that the hook should be used *gently*, and that we consequently fail to appreciate its value. Voltolini maintains that most practitioners have overlooked the physiological law that a slight irritation causes more reflex action than strong pressure; and he also urges that when his hook is used the soft palate has less power of resistance, the muscles, as it were, losing their point of leverage.

---

[1] "Rhinoscopie und Pharyngoscopie." 1879, p. 17.

[2] Op. cit. pp. 17, 18.

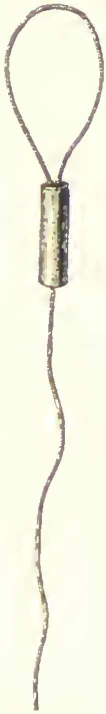

FIG. 33.
VOLTOLINI'S UVULA-NOOSE.

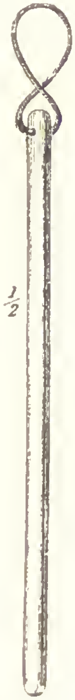

FIG. 34.
THE AUTHOR'S UVULA-TWITCH.

Other Instruments for Drawing the Uvula Forwards.—Instead of using a hook, Türck[2] suggested that the uvula should be held with miniature calculus-forceps. He also devised for the same purpose a running noose, consisting of a piece of string passed through a tube. Voltolini[1] modified this somewhat by fixing one end of the string inside the tube (Fig. 33). I have always, however, found it exceedingly difficult to apply this apparatus, but have occasionally employed a "twitch" (Fig. 34), consisting of a small piece of string threaded through the end of a rod four or five inches in length. With this the uvula can be readily caught, and a few twists of the shank will enable the operator to hold the part in any position that he may desire, without crushing or pulling it with undue violence. Dr. Löri, of Buda-Pesth, has invented an instrument, resembling a paper-clip, which has been further improved by Voltolini.[2] It is rather more than three centimetres in length, and to its handles threads are attached, the ends of which pass through the patient's mouth, and can be fastened round one of the ears. Stoerk[3] proposed to pull the uvula forwards by means of a silk ribbon passed through the nose, and brought out through the mouth. The nasal and buccal ends are then tied together, and given to the patient, who, by gently pulling, endeavours to draw the velum forwards and upwards. This plan is open to the obvious objection that the soft palate, instead of being drawn directly forwards, is tilted sideways. Surgeon-General Wales,[4] of the American Navy, improved this method by suggesting the use of an elastic tractor, consisting of an india-rubber cord, about two millimetres in diameter. This should be not less than eighteen inches in length, and one end should be carried through each nostril into the pharynx with the help of Bellocq's sound or a gum-elastic catheter. Each end, as it appears below the soft palate, should be seized with the finger or with forceps, and drawn out through the mouth. The middle part of the cord is thus fixed by the lower part of the septum in front, and by pulling gently on the free ends which pass through the mouth it will be found that the velum can be drawn forwards to any extent that may be desired. The ends may be held by an assistant, or may be tied round the patient's head. I have tried this method of enlarging the naso-pharyngeal space for the purpose of rhinoscopy with some success, but the passage of the cords through the nose into the pharynx is highly disagreeable to the patient, and their contact with the mucous membrane often increases the natural irritability of the parts. Indeed, in addition to the "gagging" which is thus caused, a flow of secretion is sometimes excited, which seriously interferes with the examination. Jarvis, of New York, uses two elastic cords, which are passed through the nose and drawn out by the mouth in the manner just described, but they are fixed over the upper lip by means of clips provided with a small upright plate grooved on the upper edge so as to serve as a support for the stem of a snare or other instrument which it is desired to use within the nose.

---

[1] Op. cit. p. 17.
[2] "Prakt. Anleitung zu Laryngoscopie." Wien, 1860, p. 65.

---

[1] Op. cit. p. 10.

[2] Op. cit. p. 12.

[3] Op. cit. p. 95. It may be mentioned that Desgranges ("Gaz. Hebdom." 1854, p. 647) proposed a similar method of enlarging the lower opening of the naso-pharynx, and Palasciano actually put it into practice a few years later ("Bericht der Naturforscherversammlung in Carlsruhe im Jahre 1858"), but in each of these cases the object was to open a wider way for digital examination of naso-pharyngeal growths. Stoerk was, so far as I know, the first who had recourse to such a means of controlling the velum for rhinoscopic purposes.

[4] "New Method of Rhinoscopic Exploration." Washington, 1877, p. 7.

In order to set free one of the operator's hands, the mirror and palate hook have been combined together by Stoerk,[1] Baxt,[2] and Duplay.[3] I cannot say, however, that I have found any advantage from this combination.

Tongue Spatulas.—I seldom employ any instrument for depressing the tongue, but occasionally a spatula may be required. Under these circumstances the instruments of Türck or Fränkel, in which the ordinary tongue-spatula is fitted to a long vertical handle, to be held by the patient well out of the way of the operator, will be found the most convenient.

THE APPLICATION OF POSTERIOR RHINOSCOPY.

The examination should be conducted as follows:—

The operator should place himself opposite the patient, who must be seated in an upright attitude, with his head erect or bent slightly forwards, the lamp being in the same position as in laryngoscopy. The patient should be directed to open his mouth widely, and the light should be made to fall rather lower in the fauces than when it is desired to examine the larynx. The rhinal mirror should then be carried to the back of the throat, its upper border being a little below the curtain of the palate, and its face directed upwards, so as to form an angle of about 135° with the horizon. If the uvula happens to be drawn upwards and backwards, as is often the case, the patient should be told to expire gently, or to produce some nasal sound, such as *hang*. Straining and forced inspiration must be especially avoided. It is sometimes necessary to depress the tongue with a spatula, but the shank of a rhinal mirror generally answers sufficiently well.

---

[1] "Zur Laryngoscopie." Wien, 1859, p. 20.
[2] "Berlin. klin. Wochenschrift." 1870, No. 28.
[3] "Traité Elém. de pathol. externe." Paris, 1877, t. iii. p. 752.

It is a good plan to pass the small mirror between the anterior pillar and the uvula on one side first, and then to withdraw it and introduce it again in the same manner on the opposite side. By slanting the mirror a little laterally the posterior corners of the naso-pharynx with the orifice of the Eustachian tubes and the folds which bound them come into view; the vault of the pharynx is seen when the mirror is nearly horizontal. When the glass is held in a nearly perpendicular position, the upper part of the arching posterior wall of the pharynx can be perceived, but the laws of perspective reduce this view to the narrowest limits. To inspect even one side of the naso-pharynx thoroughly, however, it is often necessary to introduce the mirror several times, and to turn its reflecting surface in different directions; hence the post-rhinal image (Fig. 35) is a compound picture made up of many limited views. In the middle the septum is

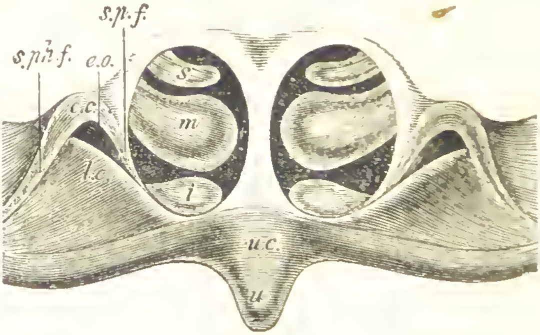

Fig. 35.—Post-Rhinal Image.

s. superior turbinated body ; *m.* middle turbinated body ; *i.* inferior turbinated body ; *e.c.* Eustachian cushion ; *e.o.* Eustachian orifice ; *u.c.* uvula-cushion ; *u.* uvula ; *s.ph.f.* salpingo-pharyngeal fold ; *s.p.f.* salpingo-palatine fold.

seen forming a thin projecting partition between the choanæ, slightly thicker above and below than in its central portion. The most conspicuous objects are the middle turbinated bodies, which appear as two pale oblong tumours extending downwards and inwards from the outer walls towards the septum, and occupying the middle third of the choanæ. Above the middle turbinated bodies the superior ones are seen as small, greyish, horn-shaped projections running in the same direction as those just below them but not extending so far inwards. At the bottom of the nasal fossæ the inferior turbinated bodies appear as two pale, rounded, solid-looking prominences, redder in colour than the middle turbinated body, and somewhat nearer the septum. The meatuses, as might be expected by those acquainted with the anatomy of the parts, are not very distinct. The superior meatus, though actually the smallest and most shallow, sometimes appears, owing to the upper turbinated body being so little developed, as the largest. The middle meatus can generally be made out, but the lower one is either not visible at all or appears only as a narrow slit below the turbinated body and close to the septum. On the outer wall of the naso-pharynx the yellow orifice of the Eustachian tube can be seen, bounded by the salpingo-palatine fold on its inner, and the salpingo-pharyngeal fold on its outer side; the base of the opening being formed by a projection, described by Zaufal as the "levator-cushion." External to the salpingo-pharyngeal fold is Rosenmüller's fossa. Beneath the septum the base of the uvula containing the azygos muscle forms a slight projection, called the "uvula-cushion." When the mirror is held obliquely so that its reflecting surface approaches the horizontal position, the vault of the pharynx comes into view, and at its anterior part a number of pale pink elevations and depressions are seen together, constituting a small irregular body of adenoid tissue, known as Luschka's tonsil (see Anatomy, Vol. i. p. 2). Quite in the centre of this there is often an opening, which has been called the mouth of this gland, but is really a small spot free from gland tissue. Behind this tonsil the smooth greyish surface of the vault of the pharynx with its median raphé is sometimes visible.

POSTERIOR RHINOSCOPY BY DOUBLE REFLECTION.

Voltolini[1] has suggested the use of two mirrors for posterior rhinoscopy, more especially with the object of obtaining a good view of the Eustachian orifice. One mirror with a long curved shank bent at a right or even a slightly acute angle is passed well up into the naso-pharynx, close to its posterior wall, in such a way that the reflecting surface is a little above the level of the choanæ; whilst a second mirror is introduced in the usual manner, but its reflecting surface is kept in a somewhat more horizontal position, so that instead of directly receiving the image of the posterior nares it receives a secondary image, first formed in the upper mirror. In employing these mirrors the uvula has to be held forwards by some of the special arrangements already described. This method is so complicated and so rarely capable of application that it requires only a passing notice. Voltolini has, however, reported one case[2] in which, by using two mirrors, he was able to see the Eustachian orifice, into which a catheter had been previously introduced.

Auto-Rhinoscopy, Magnifying Mirrors, &c.—The observations which have been already made upon the kindred subject of Auto-laryngoscopy (see Vol. i. pp. 224 and 237) apply equally here.

NASAL INSTRUMENTS.

Nasal Probes.—Useful information as to the condition of the mucous membrane, the attachment relations and density of growths, the presence of exposed surfaces of bone and various other matters can often be obtained by examining the interior of the nose with small probes. These instruments may be either straight or slightly hooked at the end, the curved portion being somewhat broad and flat, and, of course, blunt at the edge. Nasal probes, in fact, resemble those recommended for the larynx (Vol. i. Fig. 26, p. 243), as regards the distal extremity, but the stem is straight, and is fitted into a handle, at an angle of about 135°.

Nasal Bougies.—These are useful, both for purposes of diagnosis and of treatment. They are made of gum-elastic or vulcanite, and are from three to four inches in length. They may be round, or slightly flattened from side to side like the œsophageal bougies (see p. 11), and I generally find six sizes sufficient, viz., from three to eight millimetres in the short transverse diameter, *i.e.*, from one flattened surface to the other. It greatly facilitates the use of these instruments if they are probe-pointed. In introducing the bougie the flattened sides are, of course, directed towards the septum and the outer wall of the nasal fossæ respectively.

---

[1] "Die Rhinoscopie, &c." 1879.

[2] Op. cit. p. 179.

Shields.—In applying strong caustics, or in using the electric cautery within the nose, shields are sometimes required to protect the healthy parts from injury. Shurly,[1] of Detroit, has invented two instruments for this purpose. One of them (Fig. 36) is a modification of the nasal dilator, or speculum, one blade being replaced by an ivory plate. The other instrument consists of an ivory plate, which is passed into the nasal fossa, and a wire spring attached to it, which is applied to the ala of the nose externally. Both these instruments are occasionally useful, but if it be possible to dispense with them it is desirable to do so, as any shield, however well made, impedes the view and diminishes the space available for manipulation.

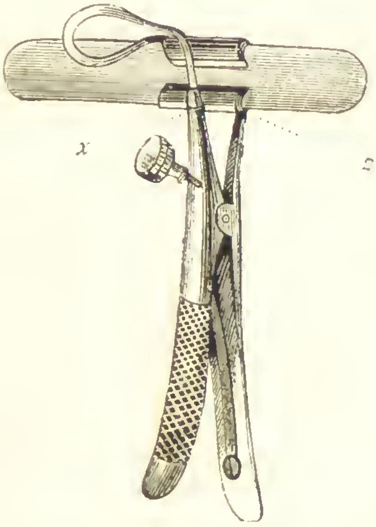

FIG. 36.—DR. SHURLY'S NASAL SHIELD.

At the points *x* and *z* the blade and plate can be reversed. The instrument can thus be made applicable for either nasal passage. As a rule it is for the purpose of protecting the septum whilst the operator is making applications to growths on the turbinated bone, that the ivory plate is required.

Insufflators.—For the application of remedies in the form of powder, the tube-insufflator (Vol. i. Fig. 39, p. 251) may be used, or the patient can apply the powder himself, by means of Bryant's auto-insufflator.[1] This consists of a bent tube, provided at one part with a corked opening for receiving the powder. The instrument having been charged, the patient puts one end of the pipe in his mouth and the other up his nose, when, by gently blowing, the powder is driven into the nasal fossa. Andrew Smith has constructed an insufflator on the model of the hand-ball spray-producer, which can be used either for the anterior or the posterior nares. It consists of a glass bottle, with an india-rubber stopper which is perforated to allow the passage of two tubes. One of these reaches but a short way into the bottle, and is connected outside with an ordinary elastic hand-ball, by means of a piece of flexible tubing, the other almost touches the bottom of the bottle, whilst its free portion is straight, and somewhat bulbous at the end, or when intended for post-nasal use, longer, and curved upwards and slightly backwards, as shown in the cut (Fig. 38 A). The receptacle being partially filled with powder the ball is squeezed once or twice, when a small quantity of the

---

[1] "St. Louis Med. and Surg. Journ." Jan. 5, 1880.

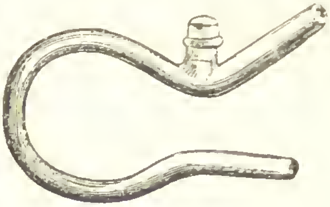

FIG. 37.—MR. BRYANT'S AUTO-INSUFFLATOR.

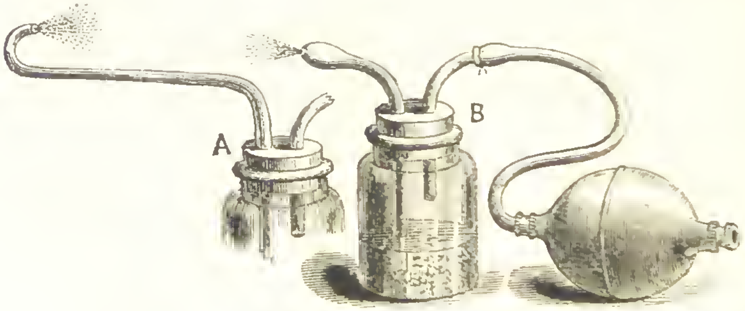

FIG. 38.—DR. ANDREW SMITH'S INSUFFLATOR.

A shows the nozzle required for the posterior nares; B, that for the anterior.

---

[1] "Practice of Surgery." London, 1872, 1st ed. p. 124.

contents of the bottle will be forced out through the nozzle. Clinton Wagner has lately brought under my notice a still more simple and handy apparatus, in which a test-tube takes the place of the bottle above described.

Brushes.—For the application of remedies to particular spots in the front part of the nasal passages a fine brush fixed to a handle at a suitable curve is often serviceable.

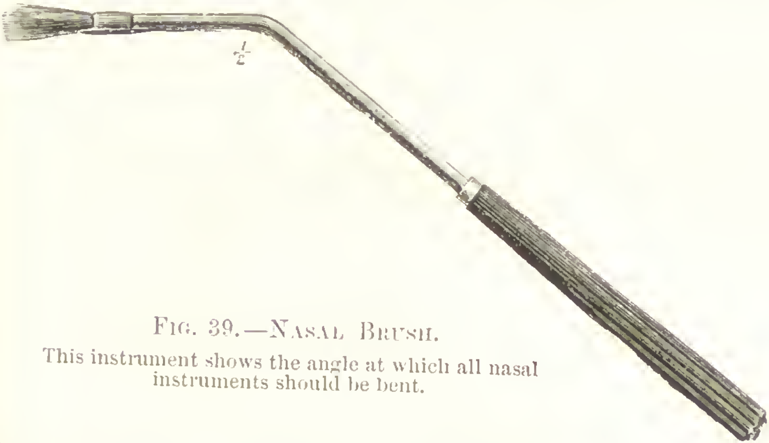

FIG. 39.—NASAL BRUSH.

This instrument shows the angle at which all nasal instruments should be bent.

For the posterior nares and naso-pharynx the laryngeal brushes Nos. 1 and 2 (Vol. i. p. 244) answer every purpose.

Caustic Holders.—Some caustics can be applied with the brush just described, and nitrate of silver may be conveniently used by simply fusing it on a metal rod (Vol. i. p. 252); but various instruments have been invented with the view of protecting the contiguous parts from the action of the caustic. A very useful instrument for the application of the solid nitrate of silver has been devised by Schrötter. It consists of a long grooved probe, provided with a turning shield, which covers the groove, into which the nitrate of silver is fused. The instrument should be introduced closed to the part which it is desired to cauterize, when the shield is turned aside, and the caustic brought into contact with the tissue to be destroyed.

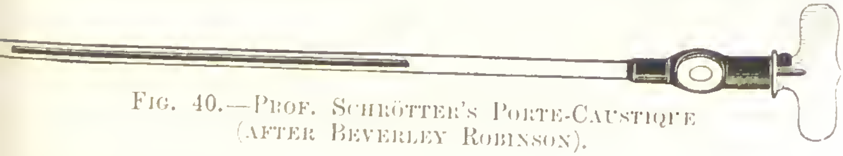

FIG. 40.—PROF. SCHRÖTTER'S PORTE-CAUSTIQUE (AFTER BEVERLEY ROBINSON).

For applying strong nitric acid and similar escharotics

Andrew Smith's instrument, which has been somewhat modified and improved by Beverley Robinson (Fig. 41), is very useful. It consists of a grooved director, made of vulcanite, and bent at a suitable angle. Into the groove a slender steel wire, armed with cotton-wool, is introduced a short way, and a few drops of acid are placed on the exposed surface of the wadding. The whole instrument, after being oiled, is then passed into the nasal fossa, and the wire rod carried along the groove as far back as may be desired. On withdrawal of the wire any excessive action of the caustic is neutralized by the passage of a similar wire, the wadding of which has been steeped in a solution of bicarbonate of soda. A more simple method is that recommended by Harrison Allen,[1] who employs a tapering rod of soft iron, slightly roughened at the distal end, for the more secure attachment of a pledget of cotton-wool, which is wound round it. The proximal extremity of the rod is fitted into a wooden handle. The rod may be bent to any shape that may be wished, and the cotton-wool can be soaked with any solution that is thought desirable: the instrument should be introduced into the nose through a speculum.

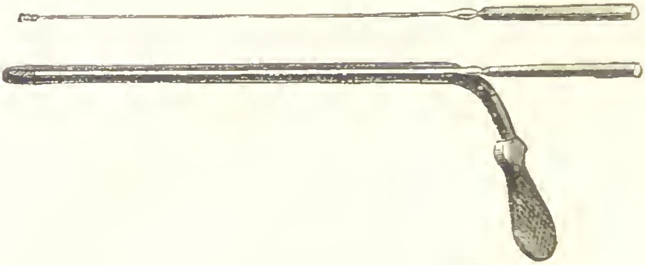

FIG. 41.—DR. ANDREW SMITH'S MODIFIED CAUSTIC HOLDER.

Hand Washes.—These require no apparatus, the medicated liquid being drawn up into the nose from the hollow of the hand. A small quantity of tepid water, in which chloride of sodium, carbonate of soda, or some other medicament has been dissolved, is used in the manner described, and when it comes into the mouth is spit out. Rumbold,[2] of St. Louis, has shown that the direction which fluids take in passing through the nose depends on the position of the patient's head. In order, therefore, that the wash may reach all parts of the nasal cavity the patient, whilst sucking up the fluid through the nose, should be enjoined first to bend his head forwards and downwards, then to keep it in a nearly erect position, and finally to throw it as far back as he is able whilst drawing up the medicated liquid.

---

[1] "Amer. Journ. Med. Sci." New Series, No. clvii. 1880, p. 62, et seq.

[2] "Hygiene and Treatment of Catarrh." St. Louis, 1880, part i.

Douches.—The douche, or irrigator, was introduced by Thudichum,[1] who first applied Weber's[2] discovery that the nasal channels act as two arms of a syphon, when the mouth is kept open. Thudichum's original instrument consisted of a piece of india-rubber tubing, about four feet in length, provided at one end with a perforated weight, and at the other with an appropriate nozzle for passing into the nostril. The weighted end of the tubing is put into a vessel containing the medicated liquid, and the latter is placed on a shelf a little above the patient's head. On starting the flow by suction at the nozzle, and placing the instrument in the nose, the fluid will run in a continuous stream until it is exhausted. This instrument has since been somewhat improved (Fig. 42) by the addition of an arm of vulcanite or metal, to cover the tube where it passes over the edge of the vessel, an arrangement which prevents the tubing from being pressed upon, and dispenses with the necessity of a weight.

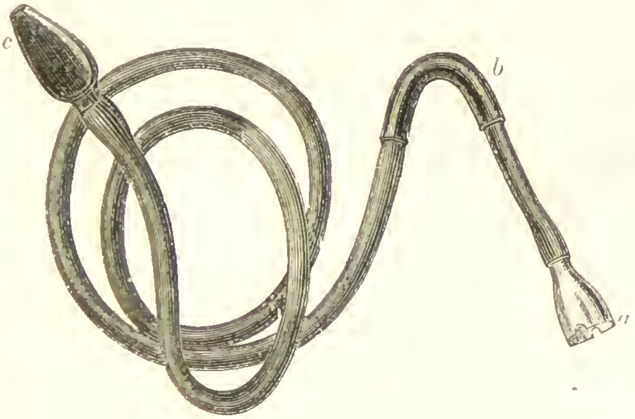

FIG. 42.—NASAL DOUCHE.

Elastic tubing terminating at *a* in a hollow metal weight, and at *c* in a nozzle, whilst at *b* is a metal or vulcanite shoulder, fitting loosely, so that it can be run along the tubing. *a*, the metal piping is placed at the bottom of a bottle or jug containing tepid saline water; *b* rests on the edge of the vessel; and *c* passes into the nose of the patient. In order to start the current, suction must first be made at the nozzle.

The Parson's douche is a still more perfect instrument, being provided with an elastic ball, by means of which the flow can be started, and a tap by which the stream can be at once shut off.

---

[1] "Lancet," Nov. 24, 1864.

[2] "Müller's Archiv." 1847, pp. 351-354.

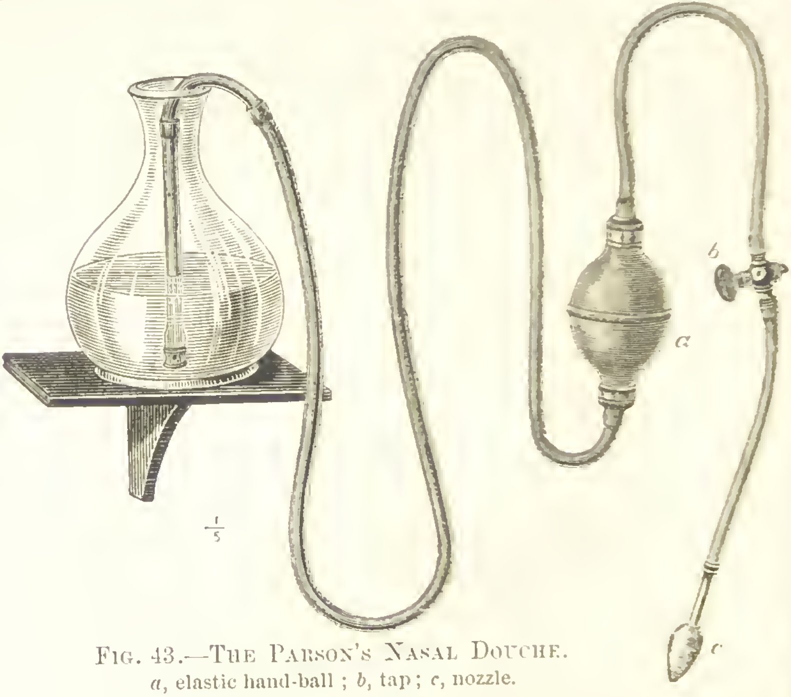

Fig. 43.—The Parson's Nasal Douche.
a, elastic hand-ball ; *b*, tap ; *c*, nozzle.

About a pint of water at a temperature of 90° Fahr. should be used, one drachm of chloride of sodium or carbonate of soda having been first dissolved in it. A few years ago irrigators were tried on a very extensive scale, but the observations of Roosa,[1] of New York, and others, showed that fluids introduced through the nose occasionally pass into the Eustachian tube, and excite severe inflammation of the middle ear. The accident is most likely to occur from the fluid being driven through the nose with too great force, or from the patient swallowing whilst using the instrument. Common salt is ordinarily employed for the purposes of irrigation, but Weber-Liel[2] has found that carbonate of soda is less likely to produce a serious result, should any fluid find its way into the middle ear. Solis Cohen,[3] who strongly insists on the value of this method of treatment, has noticed that the accident generally occurs when cold, instead of warm water, is used; and he calls attention to the fact that Cassels has tried it in 1,500 cases, without ever having seen or heard of an untoward result. I do not employ irrigation nearly so frequently as formerly; not because I have noticed any injurious effects from it, but because I have obtained equally good results from sprays, which, as a rule, are much less disagreeable to the patient.

---

[1] "Arch. of Ophthal. and Otology," vols. i. ii. and iii.
[2] "Deutsche Zeitschr. f. prakt. Med." 1877, No. 30.
[3] "Diseases of the Throat, &c." 2nd ed. p. 360.

Spray Producers.—There are a great variety of these instruments, most of those already described in connection with laryngeal disease (Vol. i. pp. 246, 247) being also serviceable in affections of the nose. As a rule, however, it is

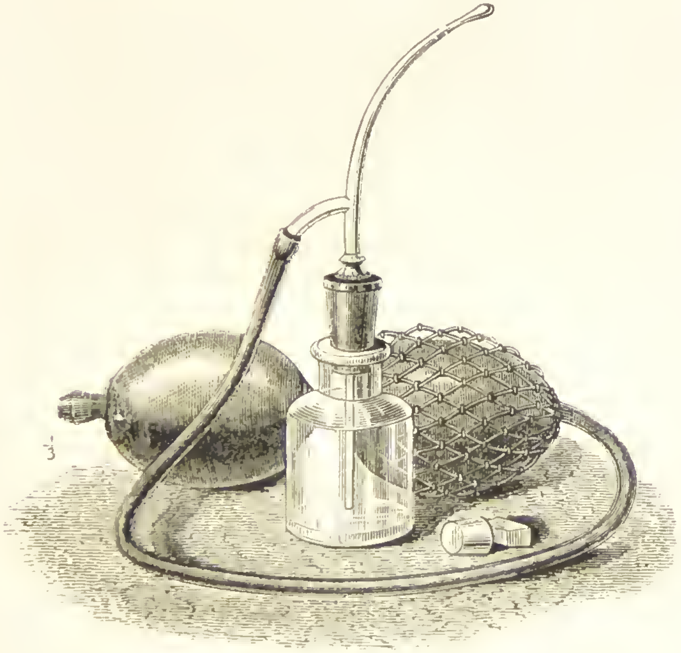

FIG. 44.—ANTERIOR NASAL SPRAY PRODUCER.

Though a reserve ball for continuous spray is shown in the cut, one ball is quite sufficient.

best to use an apparatus, the nozzle of which can be passed some distance into the nasal fossa. Two kinds of spray-producers are required, viz., the anterior and the posterior.

The ordinary anterior nasal spray-producer (Fig. 44) consists of a silver pipe about three inches long, terminating in a fine perforated point, and provided with a piece of tubing and an elastic hand-ball.

The same apparatus can be used for the posterior nares, but the tube carrying the medicated liquid should pass in a nearly horizontal direction from the bottle, and its extremity should be directed upwards and slightly backwards (Fig. 45). Lefferts prefers a *conical* nozzle (Fig. 46) which accurately fits into the nostril, and thus prevents any return of the medicated fluid. Owing to the prevalence of catarrh of the naso-pharynx in America, and the necessity of thoroughly cleansing that cavity when diseased, great attention has been given by physicians in the United States to the subject of spray-producers, and both the air-pump and water-power have been brought into requisition to give force and steadiness to the spray. The most convenient pneumatic spray-producer is that of Livingston (Fig. 47). It consists of an outer cylindrical chamber resting on a broad iron stand, and provided with an air-pump and pressure-gauge, the tube of which can be shut off from the air-chamber when desired.

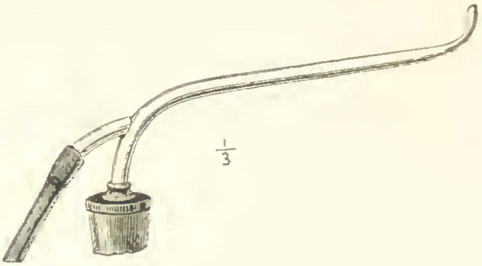

Fig. 45.—Posterior Nasal Spray-Producer.

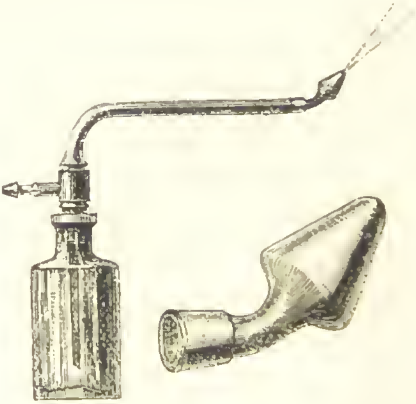

Fig. 46.
Dr. Lefferts's Nasal Spray-Producer with Conical Nozzle (after Beverley Robinson).

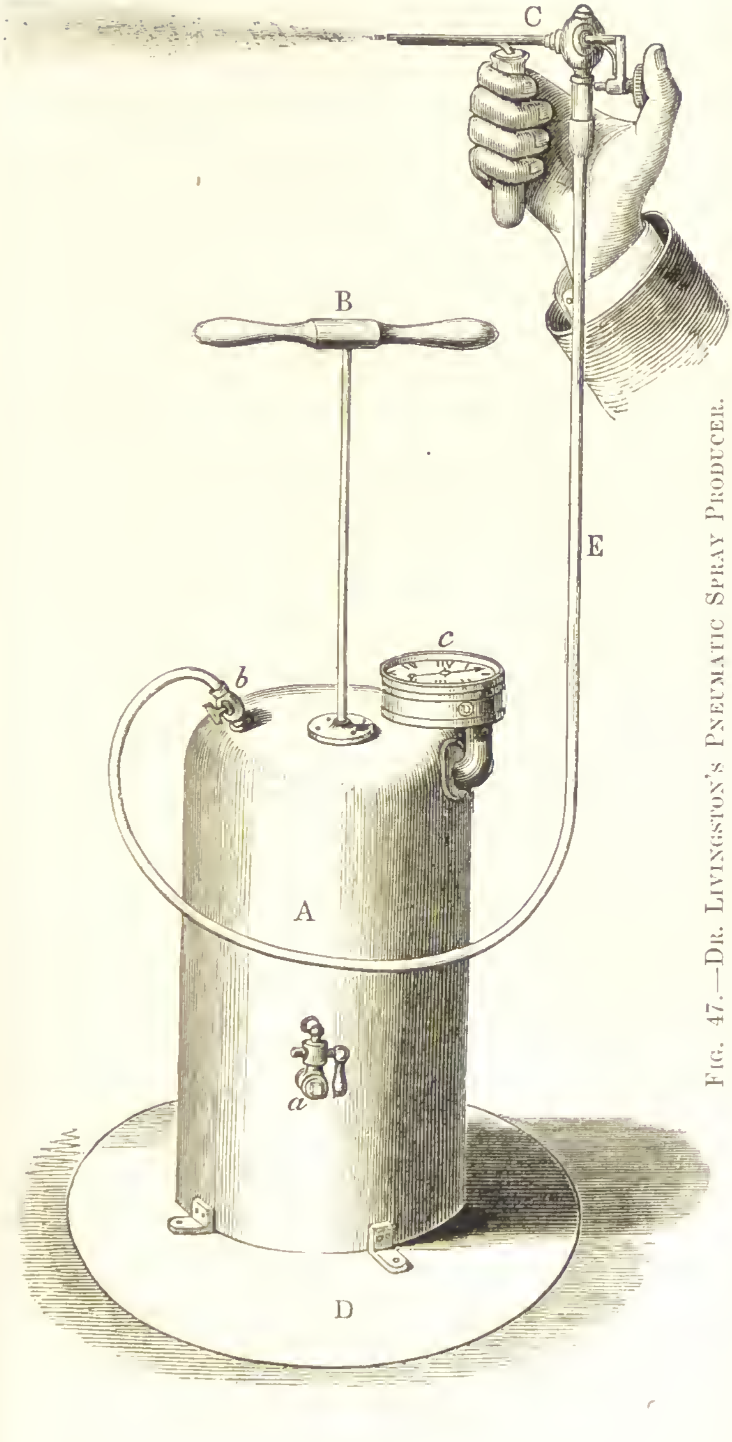

FIG. 47.—DR. LIVINGSTON'S PNEUMATIC SPRAY PRODUCER.

A, air-chamber; B, handle by which the condensing pump is worked; C, spray apparatus, consisting of two slender metal tubes, one of which issues from a test tube holding the medicated fluid, whilst between the other (horizontal) tube and the elastic pipe E, connected with the air-chamber, there is a spring-valve which is governed by the thumb of the operator; *a*, communication (fitted with a turn-tap) between the pump and the air-chamber; *b*, stopcock between A and E; D, stand; *c*, pressure-gauge.

To the top of the receiver is fitted a long piece of elastic tubing, provided with a turn-tap at its point of exit, which communicates at its further end with the horizontal and perpendicular tubes of a spray-producer. In immediate connection with these tubes, and intervening between them and the elastic pipe of the pneumatic machine, is a little piece of metal tube bent at a right angle, and provided with a springe-valve which controls the communication with the air-chamber. The perpendicular tube of the spray-apparatus passes into a common test-tube which contains the medicated fluid, and the operator, whilst holding the test-tube with his fingers, can manage the valve with his thumb. The tubes of the spray-apparatus are modifications in metal of Sass's glass tubes, and their adaptation to the air-pump permits the spray to be projected in any direction with an amount of force which can be accurately regulated.

In place of the air-pump, a hydraulic arrangement can be employed, a cistern at the top of the house supplying the pressure. A number of test-tubes containing different medicated fluids are all in communication with an air-chamber, kept constantly full of condensed air by the aid of the water-pressure derived from the cistern, and the operator, at a moment's notice, can make any spray-application desired. I recently saw an excellent form of this ingenious arrangement in working operation in the consulting-rooms of Dr. Cheetham, of Louisville, Kentucky, and it seemed to me to constitute the best method of employing sprays hitherto invented.

Inhalations.—Medicated steam inhalations used through the nose are sometimes serviceable, although seldom so beneficial as in the case of inflammation of the throat. Most of the inhalers already described (see Vol. i. pp. 248, 249), are provided with a special nozzle adapted for nasal inhalation, but the best instrument for the purpose is one lately devised by Dr. Whistler.[1] This consists of a vulcanite mould of the tip and alæ of the nose, from the upper surface of which project two hollow conical pieces for insertion into the nostrils, whilst to the under part is attached a cylindrical chamber which, by means of india-rubber tubing, can be made to communicate with an inhaler. The patient can, however, use this form of medication without any apparatus whatever, by inhaling through the mouth and forcing the vapour back through the posterior nares, as is often done by tobacco smokers.

---

[1] "Med. Times and Gaz." 1882, Vol. ii. p. 737.

Syringes.—For the injection of fluid through the anterior nares an ordinary straight glass or vulcanite syringe will serve perfectly, but for cleansing the posterior nares Solis Cohen's instrument, which has a suitably curved nozzle (Fig. 48), will be found most useful. The point is perforated with many small holes like a rose, so that the fluid is thrown out in all directions.

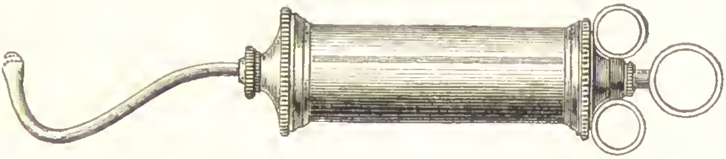

FIG. 48.—DR. SOLIS COHEN'S POST-NASAL SYRINGE.

Cutting Instruments, Forceps, &c.—For cutting away vegetations or removing polypi, forceps or snares may be employed. The old-fashioned forceps still commonly used by general surgeons for the evulsion of polypi are shown in the annexed woodcut (Fig. 49). The blades are serrated for about half their length, and are slightly curved. This forceps can often be employed successfully, but it is somewhat large, and the handle being in a line with the blades, both the instrument and the operator's hand obstruct the view of the growth.

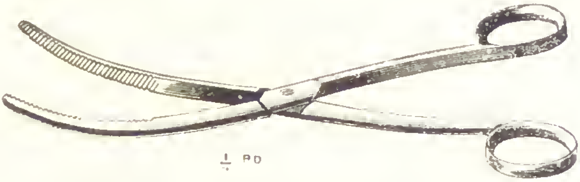

FIG. 49.—ORDINARY POLYPUS FORCEPS.

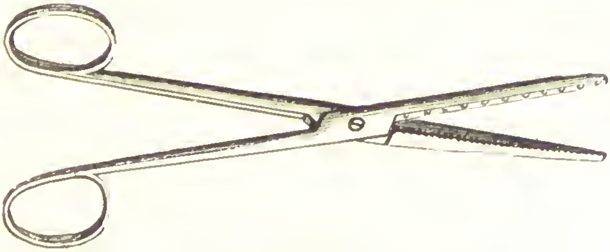

FIG. 50.—MR. GANT'S VINE-SCISSOR FORCEPS.

Mr. Gant has invented a scissor-forceps (Fig. 50) on the principle of the vine or flower-scissors, one edge of either blade being like that of an ordinary scissors, and the other broad and rasped, so as to ensure firmness of grasp, and to retain the growth after it has been divided. This instrument may be useful when the growth is unusually hard, but it is open to the objection already urged against the common forceps, viz., that it obstructs the view.

The instrument which I generally use, and which in my hands has proved thoroughly satisfactory, is my "punch-forceps" (Fig. 51). The handles are placed at such an angle as to be altogether below the level of the blades, so that the surgeon's hand in no way impedes his sight when operating. The blades themselves are slender and open in the vertical direction, so as to be well adapted for working in a narrow space. The special feature of the forceps, however, is that the lower blade carries on its surface a small projecting bar or punch of metal, corresponding to a fenestrated portion in the upper blade. A growth seized

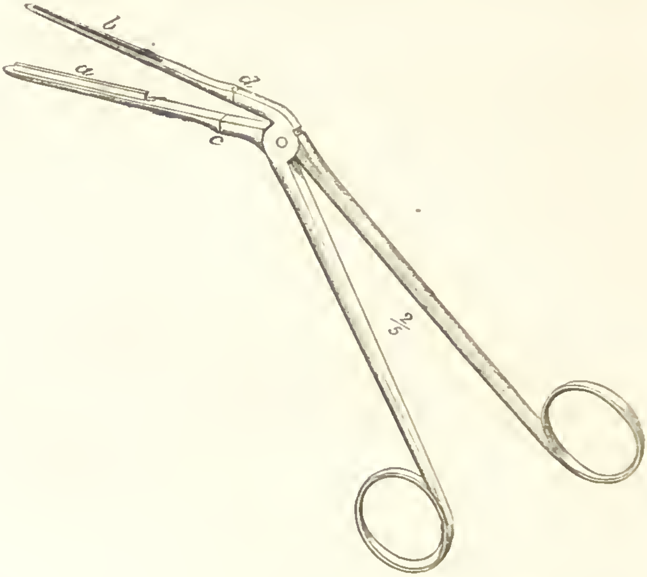

Fig. 51.—The Author's Punch-Forceps.[1]

a, small ridge or "punch," fitting, when the blades are approximated, into *b*, a fenestra in the corresponding portion of the other blade ; *d* and *c*, joints where the male and female blades can be removed and their positions reversed, or, if desired, different kinds of blades may be substituted.

---

[1] This instrument, as well as the various others which have been invented by the author, is made by Messrs. Mayer & Meltzer, Great Portland-street.

with these blades is generally cut through at once, but, if not, the forceps can of course be used for evulsion in the ordinary way; or if it be desired, the blades can be changed and blunt ones substituted.

For the removal of very small growths situated in the upper part of the nose, the axial forceps, constructed on the principle of Burge's œsophageal instrument, in which, whilst the blades themselves open widely, their shanks scarcely move, will be found useful (Fig. 52).

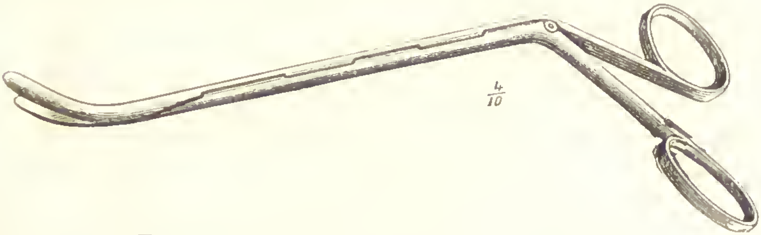

FIG. 52.—THE AXIAL POLYPUS FORCEPS.

Beverley Robinson has modified the ordinary polypus forceps by making the point longer and more slender, and providing the handles with a lock (Fig. 53). The inner surface of the blades, moreover, has a groove along the middle, whilst the edges on each side are deeply serrated. This feature, combined with the locking of the handles, gives the instrument a powerful grip, and according to Robinson renders it very suitable for the evulsion of hypertrophied mucous membrane.

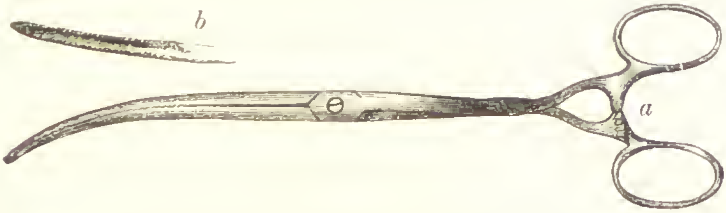

FIG. 53.—DR. BEVERLEY ROBINSON'S TOOTHED AND LOCKING FORCEPS.

a, lock by which the handles can be fixed together; *b*, separate view of on blade showing the grooved centre and the serrated edges.

A rotatory forceps for the extraction of polypi has been invented by my colleague Dr. George Stoker, whereby, after the pedicle of the growth has been seized between the blades of the instrument, these can be fastened together by means of a spring catch, and then twisted on their own axis by turning a small handle. The annexed cut

(Fig. 54) shows the mode of action of the instrument with sufficient clearness.

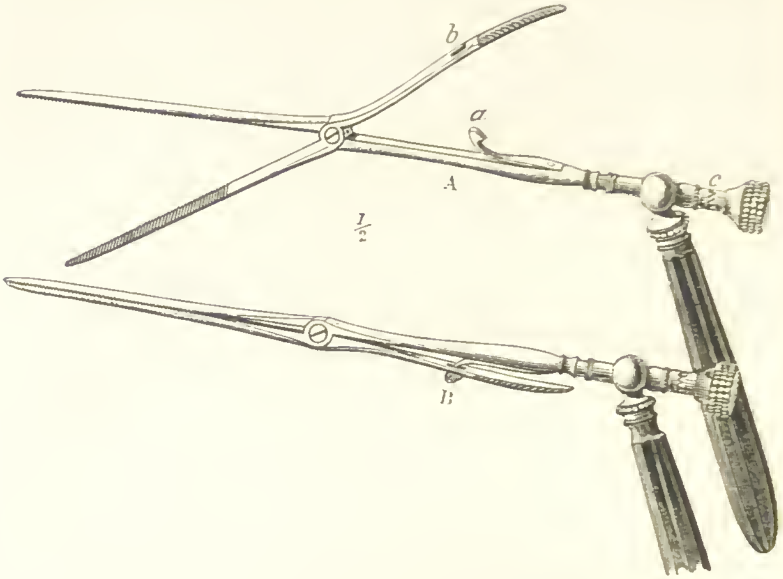

FIG. 54.—DR. GEORGE STOKER'S ROTATORY POLYPUS FORCEPS.

A shows the instrument open; *a*, the spring catch; *b*, slit through which *a* passes when the blades are brought together; *c*, double cog-screw, allowing the stem of the instrument to be twisted round independently of the handle. B shows the blades locked and partly turned round.

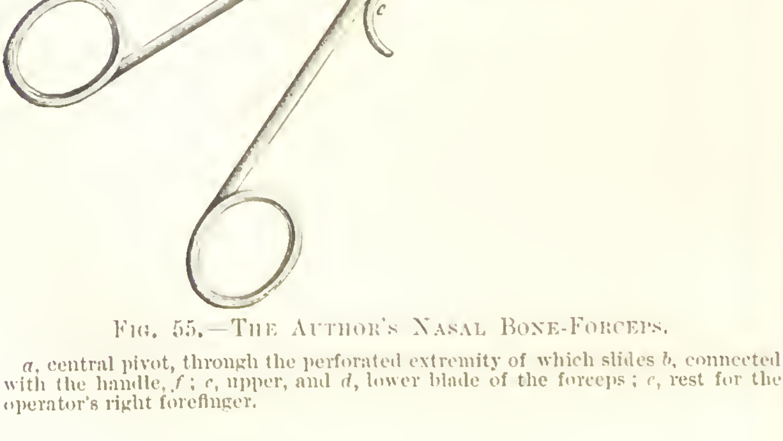

FIG. 55.—THE AUTHOR'S NASAL BONE-FORCEPS.

a, central pivot, through the perforated extremity of which slides *b*, connected with the handle, *f*; *c*, upper, and *d*, lower blade of the forceps; *c*, rest for the operator's right forefinger.

For the removal of portions of the turbinated bones and nasal exostoses, I have had an instrument made which combines the grasping power of ordinary forceps with a cutting blade. The instrument (Fig. 55) consists of deeply grooved blades, somewhat flattened from side to side, opening vertically, and constituting a tube when closed. Each blade, in point of fact, is a half tube, and has therefore an inner and an outer edge. The inner edges of each blade (those which, when the instrument has been introduced, are nearest the septum) are slightly serrated to enable the operator to seize the turbinated bone securely. Within the tube formed by the closed blades, a third blade, bevelled at its anterior extremity to a sharp edge, like a chisel, can be projected forwards when the instrument is in position. The forceps is introduced with the chisel drawn back, and the tissue to be removed having been firmly grasped with the forceps, the cutting point is driven home with the operator's free hand.

Snares and Écraseurs.—Snares have been used for many years for the removal of polypi. The best known instrument of this sort is that of Hilton[1] (Fig. 56), which consists of a quadrangular shank, terminating at one end in a ring for the thumb of the operator, and at the other in a tapering nasal portion. A cross-bar to which the ends of the wire are secured slides on the quadrangular part of the shank. The distal end of the nasal part is bulbous, and is perforated in the longitudinal direction with two holes, through which the wires pass to form a loop beyond the point of the instrument. This instrument has been im-

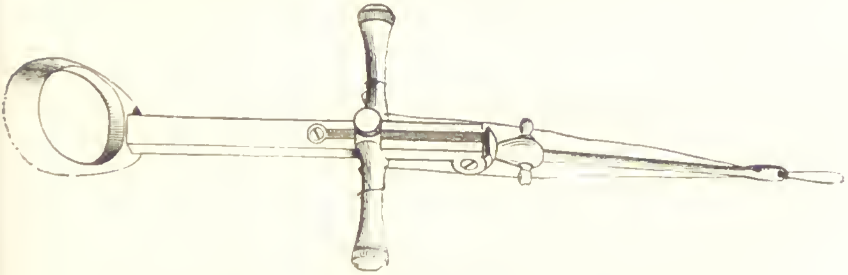

FIG. 56.—HILTON'S IMPROVED SNARE.

(This instrument has now only an historical interest, having been superseded by snares of simpler and more convenient construction.)

---

[1] For information concerning the origin of this instrument, see the History of "Non-malignant Tumours of the Nose."

proved in recent years by Clarence Blake, of Boston, Zaufal, and myself. The straight shank was first bent at a suitable angle by Blake, an arrangement permitting an uninterrupted view of the entire operation of evulsion. In Zaufal's instrument the wire at its distal extremity rests on two little rods, and the loop is only formed when the rods are thrust forwards. The loop, therefore, is not bent or pushed on one side, as is apt to be the ease during its introduction into the nose, and the wire is only "paid out" when the tip of the instrument is close to the polypus.

My own improvements consist in slight modifications of Blake's instrument, by which it can be more easily held, and the wire more readily pulled home. In my snare (Fig. 57) the thumb of the practitioner, after passing through a ring on the upper surface of the handle, is received into a slightly concave metallic rest, which can be slid along the handle and fixed at any point which suits the hand of the operator. Below this rest a tapering trigger-shaped crutch projects, upon which the tip of the ring-finger is placed.

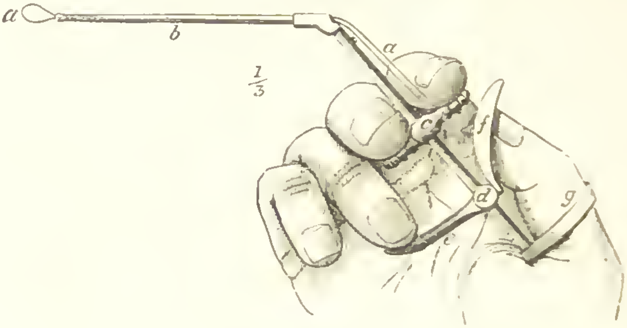

FIG. 57.—THE AUTHOR'S POLYPUS SNARE.

a, the wire; *b*, tube along which the wire is passed; *c*, centre-piece of the cross-bar; *e*, finger-rest; *d*, centre-piece to which *e* and *f* are fixed; *f*, thumb-rest; *g*, ring for thumb.

The great attention which has recently been given to hypertrophy of the turbinated bodies, has led to the invention of several instruments for the removal of the redundant tissue. Among these must be especially mentioned a very delicate and, at the same time, highly practical form of snare which has been devised by Jarvis, of New York.[1]

---

[1] The value of the *principle* of this instrument may be gathered from the fact that within six months of its description having been published, no less than seven modifications or so-called "improvements" were brought out in America and England.

The instrument (Fig. 58) consists of a straight nickel canula, seven inches in length and one-sixteenth of an inch in diameter. Its outer surface is smooth for four inches from the distal end; but for the rest of its length it is wormed. Over this portion is fitted a second canula somewhat larger in bore; this is smooth exteriorly, but grooved on its inner surface to prevent any rotation. Over the screw-thread runs a small wheel, half an inch in diameter and three-sixteenths of an inch thick, roughened on the outer edge, and so arranged as, when it is turned, to push before it the movable canula. At the proximal extremity of this outer tube are two small pins, round which the ends of the wire may be secured after being drawn through the whole length of the inner canula. The loop of wire that projects from the distal extremity of the canula may, of course, be of any size that is required. The advantages of the instrument are that it can be easily worked, and that the loop of wire may be tightened, either *slowly* by turning the wheel and thus gradually pushing down the outer tube on which the wire is fixed, or *quickly* by pulling back the outer tube itself. It is obvious that this little instrument is well adapted for removing mucous polypi as well as hypertrophied mucous membrane.

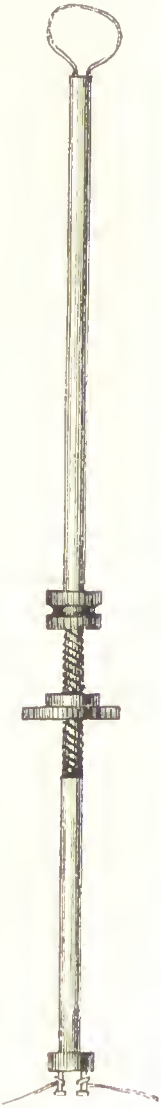

FIG. 58.
DR. JARVIS'S NASAL ÉCRASEUR (AFTER BOSWORTH).

My former assistant, Jefferson Bettman, now of Chicago, has modified Jarvis's instrument by having the end of the tube flattened, so that the point of exit of the wire can be placed in closer apposition to the surface on which it is desired to operate. The modified snare, moreover, is made in several parts, and tubes of various calibre, length, and shape, can be substituted for the original straight one. By this means the snare can be used for the posterior nares. Another advantageous feature in Bettman's snare is that instead of having to be twisted round pegs, the free ends of the wires are fixed by means of a clamp screw, which can be tightened or slackened at pleasure.

An excellent modification of Jarvis's snare has lately been made by Bosworth,[1] who has had it bent at the proper angle for nasal instruments.

Écraseurs.—For the removal of the denser varieties of polypus, I have found the écraseur represented in the accompanying woodcut (Fig. 59) very useful. In this instrument the wires are threaded through a barrel and wound round two reels by means of a lever, which works a cogwheel. The barrel is about nine centimetres in length, and is flattened for about twenty millimetres at the distal end to allow of more easy insertion into a narrow channel.

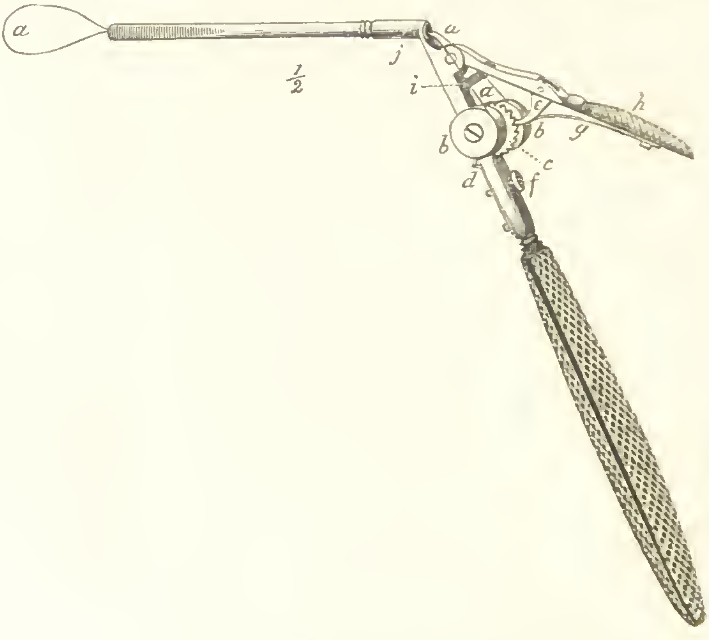

Fig. 59.—The Author's Nasal Écraseur.

a, the wire passing from the end of the barrel to the two reels *b*; *c*, cog-wheel; *d*, stop-spring, which, by pressing on the button *f*, is released, allowing the reels to be unwound; *e*, tooth controlled by the spring *g*, which in its turn is acted on by lever *h*; *i*, spiral spring raising lever after use; *j*, short cylindrical portion of shaft in which the proximal end of the barrel is contained.

Electric Cautery.—The electric cautery is extremely useful for the destruction of polypi, of hypertrophied mucous membrane, and cartilaginous out-growths. For application within the nose any of the electrodes already described (Vol. i. p. 508) can be employed, the wires, however, being previously suitably bent. For the last four years I have employed Schech's admirable electrodes,[1] which enable the operator to treat almost any case. For the application of cautery to the central portion of the nasal fossa Löwenberg's instrument (Fig. 60)

---

[1] "Philadelphia Med. News," Feb. 24, 1883, p. 230.

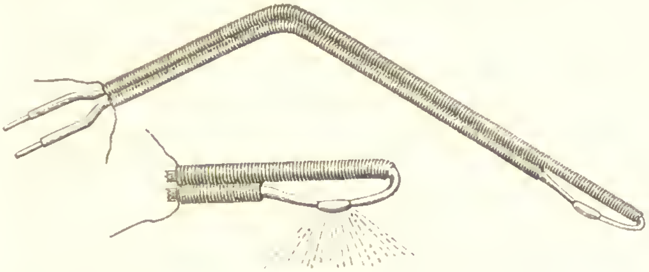

Fig. 60.—Dr. Löwenberg's Nasal Electrode.

has, however, the great advantage that it can be readily used without a shield; for the incandescent point, instead of being placed at the distal extremity of the electrode, is situated at the side on one of the wires, so that when in the nose the other wire protects the healthy parts.

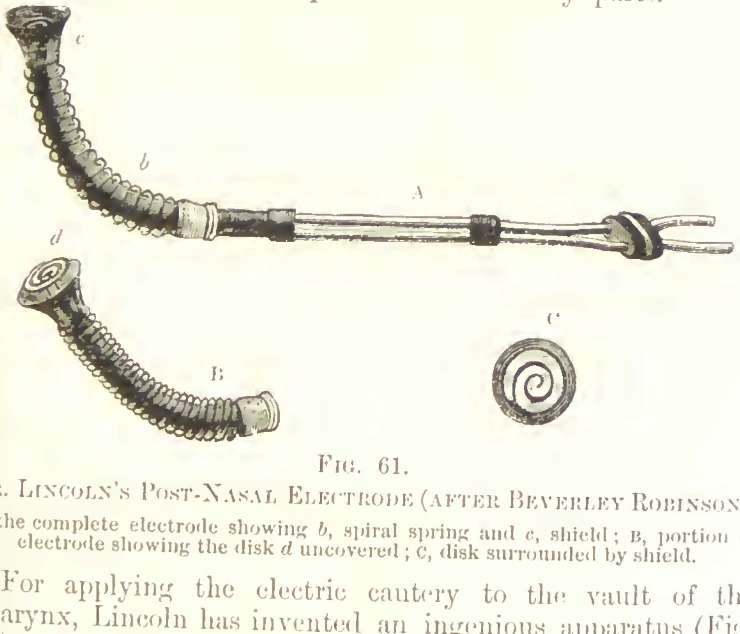

Fig. 61.

Dr. Lincoln's Post-Nasal Electrode (after Beverley Robinson).

A, the complete electrode showing *b*, spiral spring and *c*, shield; B, portion of electrode showing the disk *d* uncovered; C, disk surrounded by shield.

For applying the electric cautery to the vault of the pharynx, Lincoln has invented an ingenious apparatus (Fig. 61). It consists of an electrode, around which is fixed a spiral spring, ending in a bell-shaped shield of bone, which projects beyond the electrode and conceals a platina disk which terminates the electrode. When the instrument is pressed against the tissue to be destroyed, the shield is forced back on the spring, and the electrode is thus allowed to come into contact with the affected part.

---

[1] Made by Albrecht, of Tübingen, at a very moderate cost.

Post-Nasal Forceps.—For removing growths from the vault of the pharynx, and from the neighbourhood of the posterior nares, Löwenberg's curved forceps and my own sliding forceps are both of service. The former (Fig. 62) is an instrument with long slender curved handles and very short blades turned upwards from the rivet at an obtuse angle. The blades are scooped out on their inner surfaces, and each ends in a sharp, somewhat overhanging edge, which comes into apposition with the corresponding part of its fellow when the handles are closed. My colleague, Dr. Woakes,[1] recommends that the cutting edges should be carried further round the blades than was the case in Löwenberg's earlier instruments.

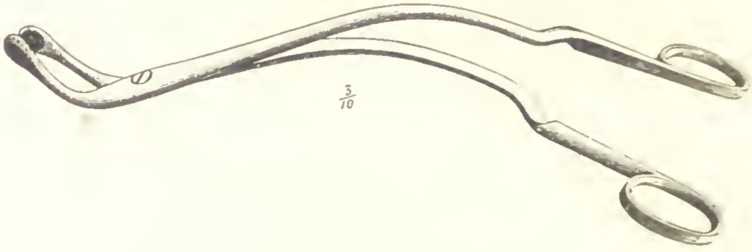

FIG. 62.—DR. LÖWENBERG'S POST-NASAL FORCEPS.

My own instrument (Fig. 63) consists of a male and a female portion. The latter is a straight cylindrical tube open on the upper aspect throughout its whole length, and ending in a sharp, spoon-shaped blade at the distal extremity; the male portion is composed of a solid shank playing backwards and forwards in the cylindrical part of the other limb of the instrument, and terminating in a blade of similar shape to the other, directed so that when the two are brought together the cutting edges correspond. The handle is fixed to the under surface of the proximal end of the female portion, the rivet being close to the body of the instrument, and the limbs placed one behind the other. The anterior one is fixed, and to the posterior, which can be moved backwards and forwards, is attached a lever which traverses a slit in the anterior limb to the under surface of the cylinder, where it is fixed to a pin connected with the shank of the male portion. The opening along the top of the cylinder allows the upturned

---

[1] "Trans. Intern. Med. Congress." London, 1881, vol. iii. pp. 295, 296.

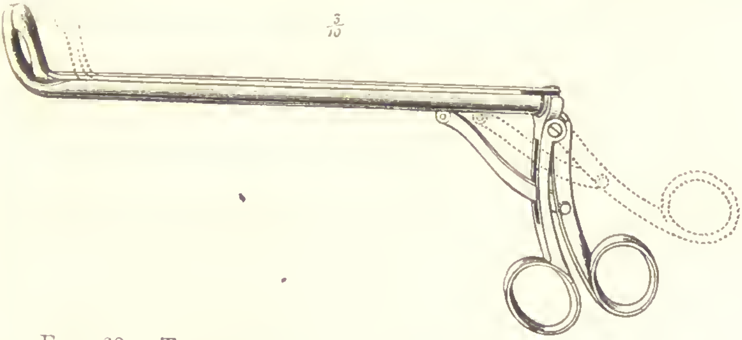

FIG. 63.—THE AUTHOR'S SLIDING POST-NASAL FORCEPS.

blade of the male portion to be pulled back as far as the limbs of the handle can be opened. The instrument is better adapted for the removal of growths from the *sides* of the pharynx, whilst Löwenberg's is more suited for operating on those on the *vault* and *posterior wall.*

Michael,[1] of Hamburg, has invented an instrument for the removal of adenoid vegetations, which he states that he has used for the last three years. He calls it a double chisel, but it is, more strictly speaking, a cutting forceps. The blades are turned up at a right angle from the stem, the angle, however, being well rounded, and the cutting edge extending three centimetres beyond that point. It differs from other forceps of an analogous character in the circumstance that the principal cutting part of this instrument is at the angle and not at the point, as in Löwenberg's and my own. I may add that I have not found Michael's instrument at all convenient.

In removing post-nasal vegetations, Meyer, of Copenhagen, prefers to use his own "ring-knife." This "consists, first, of a little ring of a transverse oval shape, its axes being 1·4 and 1 centimetre respectively, and its breadth 1·5 millimetre, having one edge sharp, although not absolutely cutting, and the other one rounded off; and secondly, of a slender, stiff, but at the same time flexible stem ten centimetres long, bearing the ring at one extremity, fixed into a roughened handle at the other."[1] Meyer's plan of operating is to introduce this instrument through the patient's nose into the naso-pharynx with the right hand, whilst the left index finger is passed into the mouth behind the velum, where it is made to press the vegetations against the edge of the ring-knife, which must at the same time be drawn downwards, so as to scrape away the excrescence. The stem being flexible, the knife can be bent towards one side or the other, as may be necessary.

---

[1] "Berlin. klin. Wochenschrift." 1881, No. 5.

Stoerk has had a special loop (Fig. 64) adapted to his laryngeal guillotine (Fig. 48, Vol. i. p. 259) for the removal of post-nasal growths. By means of this instrument I have several times taken away vegetations from the vault of the pharynx.

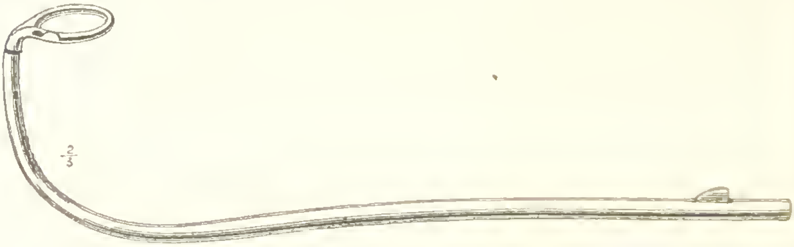

FIG. 64.—PROF. STOERK'S POST-NASAL SNARE.

For the removal of small post-nasal vegetations Capart has suggested the use of a sharp spoon (Fig. 65) which can be fastened on the index finger by means of a metallic

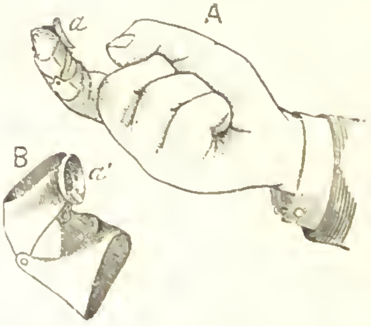

FIG. 65.—DR. CAPART'S FINGER SHEATH WITH CUTTING SPOON.

A, the position of the hand and finger in holding the spoon: *a*, lateral view of the cutting spoon. B, enlarged view of the two parts of the metal sheath; *a'*, cutting spoon.

---

[1] "Med.-Chir. Trans." London, 1870, vol. liii. pp. 211, 212.

sheath composed of two rings, held together at each side by rivets, so that sufficient play is allowed for them to be moved when the finger is bent. On the palmar surface of the distal ring is the spoon. The little instrument thus serves to carry the blade, and to protect the operator's finger whilst it is in the patient's mouth. Many surgeons, however, prefer the natural cutting edge provided by a sharp forefinger nail.

For the purpose of removing small sequestra of bone or other broken-down tissue, or of "vitalizing" the borders of an indolent ulcer within the nasal cavity, Volkmann's cutting spoons are very useful. I have had curettes of various sizes fitted to a handle at the proper "nasal angle" (Fig. 66.)

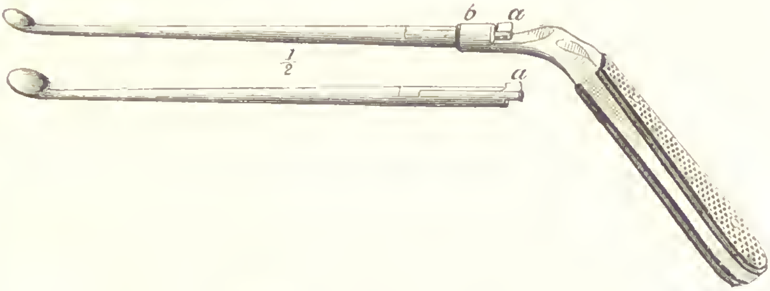

FIG. 66.—NASAL CURETTES OR SHARP SPOONS.

a, spring catch; *b*, articulation of the stem with the handle, which ends in a ring to receive it; the catch *a* is shown in position in the upper woodcut.

Hæmostatic Instruments.—For arresting hæmorrhage from the nose, plugging the nostrils anteriorly is often found insufficient, and it then becomes necessary either to close the posterior nares, or to apply pressure within the nose. Hence there are post-nasal plugs and intra-nasal plugs.

Of the former kind of instrument Bellocq's well-known sound (Fig. 67) is the best. It consists of a piece of watch-spring, attached to a stylet contained in a canula. The watch-spring is fixed by a screw to the proximal end of the stylet, so that the point holding the string projects beyond the canula. After the instrument has been introduced through the nose, the screw is turned round, so that the watch-spring runs down the stylet and becomes attached to its lower end, while its free extremity projects into the pharynx near the base of the tongue, allowing the string to be readily seized with the fingers or forceps. A firm pledget of lint, sufficiently large to cover both choanæ completely should be tied to the string, which is then drawn back through the nose and fastened round the ears. The string should be further secured to the face by strips

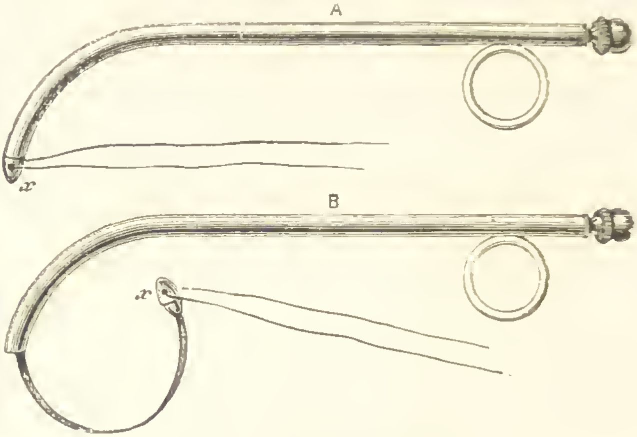

Fig. 67.—Bellocq's Sound.

A, the instrument with the stylet x armed with a thread and ready for use; B, the same after introduction through the nares, the stylet x appearing at the back of the mouth.

of plaster. This instrument, however, is very seldom at hand when wanted, and an ordinary flexible catheter will be found quite as useful. The most efficient post-nasal plug, however, is that of St. Ange[1] (Fig. 68). This instrument, which bears the formidable name of "rhinobyon," consists of three parts, viz., a small syringe; a tube opening at its distal end into an india-rubber bag; and a small pilot sound. The pilot is introduced into the tube, and the bag is thus passed through the nose into the naso-pharynx, when the pilot is withdrawn, and the nozzle of the syringe being fitted to the mouth of the tube, air is injected and the bag distended to such an extent as to cover the choana. A little clip attached to the tube keeps it closed when the syringe is withdrawn.

---

[1] Lapeyroux: "Méthode pour arrêter les hémorrhagies nasales." "Thèse de Paris." 1836, No. 314. In the original instrument there is a tap in the india-rubber tube instead of the little clip above-mentioned. Küchenmeister subsequently invented an instrument which he called a "rhineurynter," closely resembling the one here described.

Of intra-nasal plugs J. P. Frank[1] appears to have been the inventor, for he was the first to devise a special instrument (if such it can be called) to bring pressure to bear directly on the walls of the nasal fossæ. He introduced into the nose a piece of dried hog's intestine, tied at the distal end, and then injected water into the open end projecting from the nostril, tying up the gut as he withdrew the syringe. The best form of instrument, however, for this purpose, is that invented by Dr. Cooper Rose (Fig. 69). It consists of a thin india-rubber bag connected with a tube, provided with

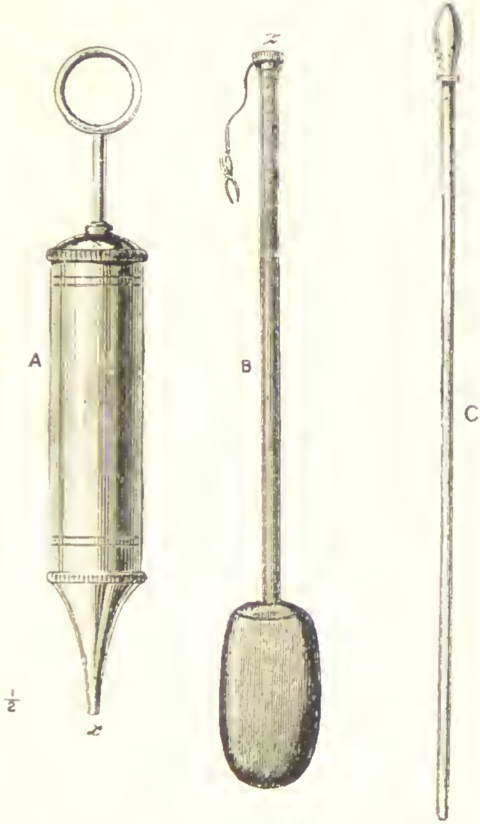

FIG. 68.—ST. ANGE'S RHINOBYON, OR POST-NASAL PLUG.

A, syringe for injecting air or water; B, india-rubber tube or bag; C, pilot for bag. After the bag has been introduced, the point *x* of the syringe fits into the orifice *z*.

---

[1] "De curandis hominum morbis." Mannhemii, 1807, lib. v. pars ii. p. 144.

a stopcock. The bag is introduced empty into the nose and passed along the fossa, when it is inflated by blowing through

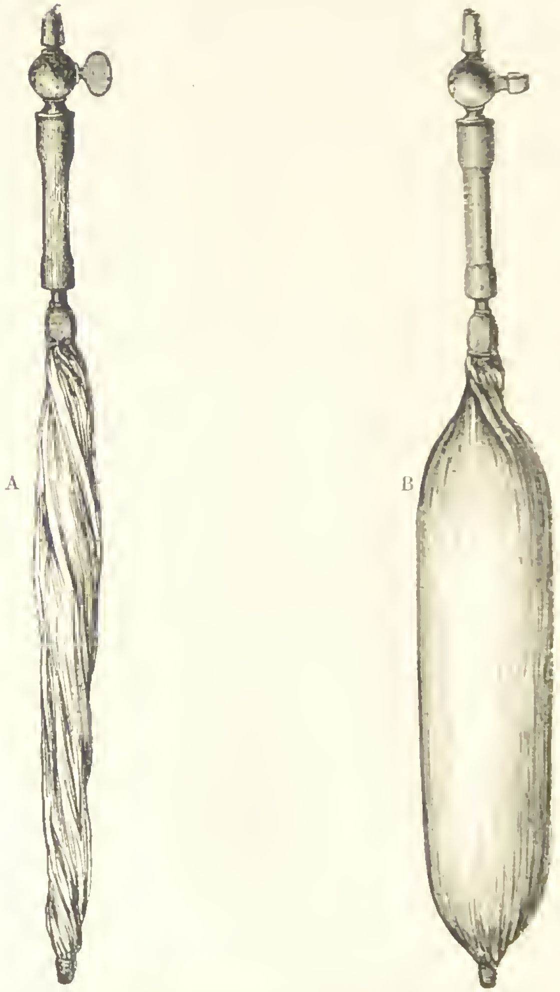

Fig. 69.—Dr. Cooper Rose's Intra-Nasal Plug[1]
(after Spencer Watson).

A, the instrument as ready for introduction into the nose; B, the same expanded with air.

the tube. The tap should then be turned off and the instrument left *in situ* as long as may seem desirable.

Instruments for the Removal of Foreign Bodies from the Nasal Cavities.—Gross's instruments, shown in the annexed woodcut (Fig. 70), may be found useful. They consist of little scoops, cork-screw points and hooklets. For the extraction of small nasal calculi, slender forceps (Fig. 71) have been recommended. The blades, which are scissor-shaped, and terminate in roughened bulbous ends, articulate only after they have been passed separately into the nose. Instruments bent at the proper angle (Figs. 39 and 51) will, however, generally be found more convenient, as they do not obstruct the view of the operator.

---

[1] This instrument is made by Messrs. Coxeter, Grafton-street East.

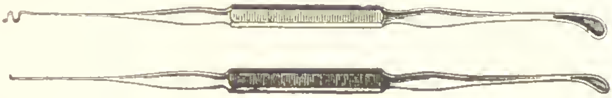

FIG. 70.—PROF. GROSS'S NASAL SPUDS (AFTER SOLIS COHEN).

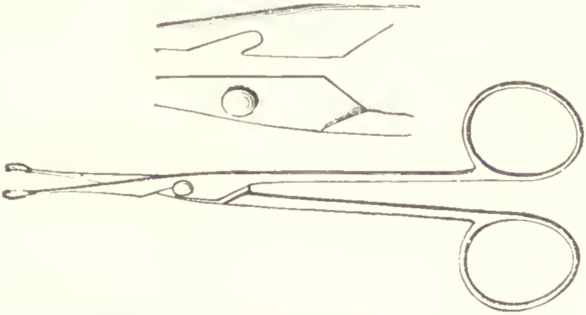

FIG. 71.—FORCEPS FOR REMOVING SMALL FOREIGN BODIES (AFTER SPENCER WATSON).

Other Instruments.—For the remedy of deformities of the nose, arising from congenital deviation or badly set fracture of the septum, Adams[1] employs a pair of powerful forceps (Fig. 72), with smooth flat blades which can be

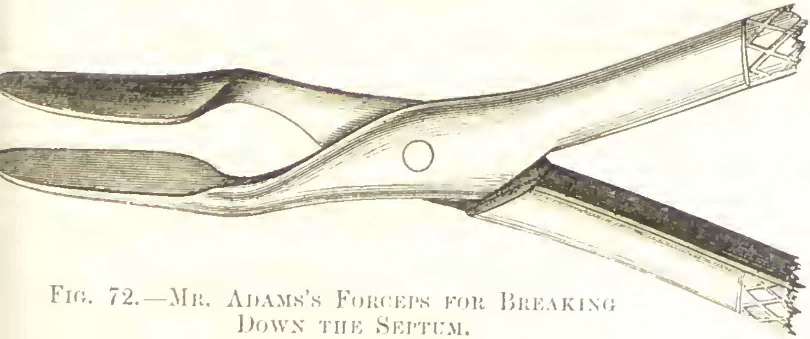

FIG. 72.—MR. ADAMS'S FORCEPS FOR BREAKING DOWN THE SEPTUM.

---

[1] "Med. Soc. Proceedings," April 26th, 1875. London, 1874-5, vol. ii. pp. 99, 100.

easily introduced into the nasal fossæ and made to grasp the partition between them. With this instrument it is easy either to separate the cartilaginous from the bony part of the septum, or to fracture the former, if desired. The fragments are retained in their new position by means of two little splints made either of ivory or steel, one being placed in each nostril, and the two fastened together outside with strings. These splints, however, cannot be kept in apposition without a truss to make pressure on the upper fragment, and an ingenious arrangement for this purpose has been devised by Adams.[1]

Jurasz[2] of Heidelberg, was led to improve upon this plan on finding that the septum regained its wrong position when he withdrew the forceps, before there was time to adjust the splint. He therefore modified Adams's instrument by having the blades and shanks of the forceps separate, though screwed together. The instrument is introduced, the septum broken, the shanks unscrewed, whilst the blades, locked together on the principle of the ordinary midwifery forceps, remain in the nose to act as splints.

For plugging the nasal fossæ in cases of ozæna, Gottstein's cotton wool tampon (Fig. 73) is extremely useful. All that is required is a screw about fourteen millimetres long, terminating in a shank fixed to a handle. Round this screw a small piece of wadding is twisted. The instrument is then inserted into the nasal channel, when the screw is reversed and withdrawn, leaving the cotton-wool accurately in position.

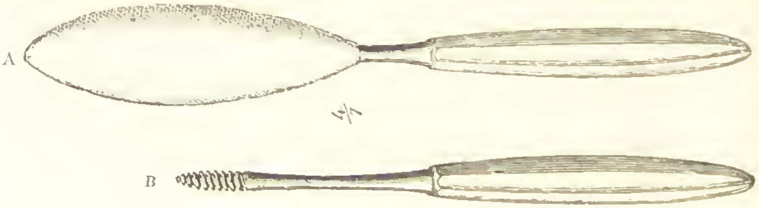

FIG. 73.—DR. GOTTSTEIN'S COTTON WOOL TAMPON.

A, screw armed with wadding-tampon; B, the naked screw.

Temporary Sponge-Tampon for the Posterior Nares.—In the case of infants and very young children sprays should not be used through the anterior nares without care being first taken to prevent the fluid from running through the posterior nares into the larynx. These openings should, therefore, be temporarily plugged. This can be most conveniently effected by passing a small sponge into the naso-pharynx by means of the instrument shown in the annexed woodcut (Fig. 74). This consists of a short metallic stem fitted to a wooden handle at the proper "nasal angle," and curved upwards at its distal end into a bulbous perforated point. A piece of sponge is stitched to the point of the instrument.

---

[1] "Brit. Med. Journ." 1875, vol. ii. pp. 421, 422. The instrument has been considerably modified by Mr. Adams, since he first published a description of it. It is sold by Mr. Gustav Ernst, Charlotte-street, Fitzroy-square.

[2] "Berlin. klin. Wochenschrift." 1882, No. 4.

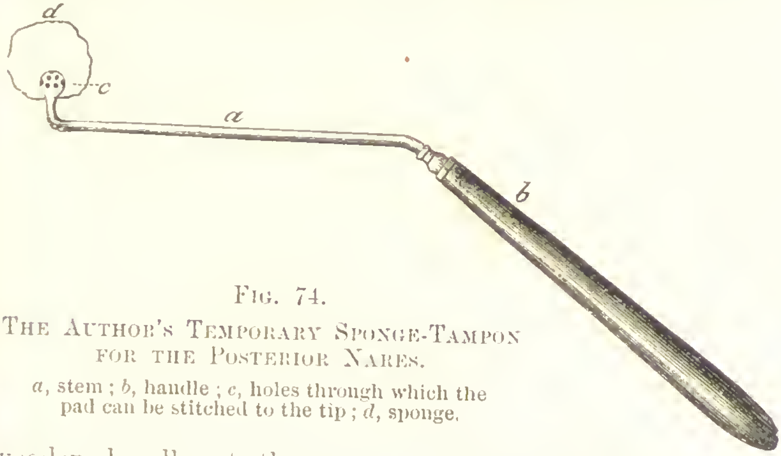

Fig. 74.

The Author's Temporary Sponge-Tampon for the Posterior Nares.

a, stem ; *b*, handle ; *c*, holes through which the pad can be stitched to the tip ; *d*, sponge.

ACUTE NASAL CATARRH.

(Synonyms : Coryza ; Cold in the Head.)

Latin Eq.—Gravedo : Catarrhus narium.
French Eq.—Catarrhe nasal.
German Eq.—Schnupfen.
Italian Eq.—Corizza.

Definition. — *Acute catarrhal inflammation of the Schneiderian membrane, causing sneezing, more or less obstruction of the nasal passages, and hyper-secretion of an irritating serous or sero-mucous fluid.*

History.—Until the seventeenth century it was the belief of physicians that coryza was a flux of serous fluid from the cerebral ventricles, and a "cold in the head" was looked upon as a "purging of the brain." This idea prevailed till Schneider[1] gave a more correct account of the anatomy of the nose, and in particular of the function of the membrane that bears his name. Within the succeeding century several works were published on catarrh by Wedel,[2] P. Frank,[3] Camerarius,[4] Stoll,[5] and others, but no fresh light was thrown on the subject till J. P. Frank,[6] towards the close of the last century, gave a very full account of the complaint. Several years afterwards Rayer[7] published a short monograph, in which he showed how dangerous the affection is to sucklings. In the elaborate treatise on the nose by Cloquet,[8] a chapter is devoted to coryza, which is equally remarkable for antiquarian lore and practical wisdom. In 1837 Billard[9] followed up the clinical investigations of Rayer in relation to infantile catarrh. In the same year the subject was discussed by Anglada[10] at some length, but with no novelty of view as regards either the nature or the treatment of the malady. Since then the writings of Bouchut,[11] Kussmaul,[12] and Kohts[13] have elucidated the affection, especially as regards infants. Vauquelin[14] appears to have made the earliest investigations on coryza from the chemical point of view, but Donders[15] was the first to publish a detailed analysis of the secretion. Friedreich[16] made some experiments on the inoculability of the disease, and to Ranvier[17] we owe an elaborate account of coryza from the purely pathological standpoint.

[1] "De catarrhis." Wittenbergæ, 1664.

[2] "Casus laborantis coryzâ." Jenæ, 1673.

[3] "Dissert. de coryzâ." Heidelberg, 1689.

[4] "De coryzâ." 1689.

[5] "Ratio Medendi," t. iii. p. 44.

"De curand. homin. morbis." Mannhemii, 1794, lib. v. p. 102. et seq.

[7] "Sur le Coryza des Enfants à la Mamelle." Paris, 1820.

[8] "Osphrésiologie." Paris, 1821.

[9] "Maladies des Nouveau-nés." Paris, 1837. 3me ed. p. 502. et seq.

[10] "Sur le Coryza simple." Thèse de Paris, 1837.

[11] "Traité pratique des Maladies des Nouveau-nés." Paris, 1867.

[12] "Zeitschrift für rationelle Medicin." 1865.

[13] "Krankheiten d. Nase," in Gerhardt's "Handbuch d. Kinderkrankheiten.' Dritter Bd. Zweite Hälfte. Tübingen, 1878.

[14] Quoted by Anglada. Op. cit. p. 16.

[15] "Nederlandsch. Lancet." 1849-50, 2 series. v. p. 312.

[16] "Virchow's Handb. d. Pathol. und Therapie." Erlangen, 1865. Bd. v. Abtheil I. p. 398.

[17] "Soc. de Biologie de Paris." Summary in "Lancet." 1874. vol. i. p. 687.

Etiology.—The causes of catarrh in general have already been discussed in previous sections (Vol. i. pp. 15 and 265), and only a few remarks need be made here concerning the etiology of nasal catarrh. As in most other diseases, there are *predisposing* and *exciting* causes. Among the former youth is one of the chief, children being particularly subject to coryza. The comparative immunity of the aged was recognized as far back as the time of Hippocrates.[1] Certain constitutional conditions seem to render the mucous membrane more susceptible to catarrh, and this is especially seen in the strumous diathesis. In these cases there is not unfrequently at the same time chronic enlargement of the tonsils, and sometimes catarrh of the naso-pharynx with obstruction of the Eustachian tubes. The nasal disease may be the cause or the consequence of these conditions, or, in some cases, all the phenomena may depend on a general dyscrasia. People of rheumatic constitution, and those in whom the sweat-glands act feebly, are also prone to nasal catarrh. Alibert[1] maintains that persons of decidedly nervous temperament are especially liable to the complaint, and he states that he has seen extremely acute forms of nasal catarrh, with very profuse secretion, occur in women after convulsions. Asthmatic people are particularly liable to the affection, and hay fever may be regarded as a connecting link between these two disorders.

---

[1] "Aphorism." Paris, 1844, ii. 40. Littré's ed. t. iv. p. 483.

Exposure to cold, under certain circumstances, is very apt to cause catarrh, but the exact mode of its operation is uncertain. Cold currents of air on the head are familiarly recognized as a cause of the disorder, and the bald are in this respect, of course, peculiarly vulnerable. Cloquet[2] was of opinion that the frequent occurrence of coryza after getting the feet wet or cold, was to be explained by some special sympathy between the feet and the pituitary membrane, a connection which he attempts to support by an isolated case, in which nasal catarrh was always a concomitant of gout in the toe.[3] The truth seems to be that catarrh so frequently results from wet feet, simply because those extremities are exposed to wet and cold more often, and for longer periods than any other covered portion of the body.

The influence of heat in producing catarrh is less generally recognized, and its mode of action is very imperfectly understood. Its effects are seen under two conditions: first, where the disease results from exposure to the sun; secondly, where it follows confinement in hot rooms. The catarrhal symptoms, arising from exposure to the sun, may be due to direct irritation by the solar rays, or it may be of reflex character, *i.e.*, dependent upon the impression on the retina. Coryza resulting from confinement in a hot room is generally observed in persons of enervated constitution, whose mucous membrane has been relaxed by previous attacks.

---

[1] "Obs. sur les Affections Catarrhales en Général." Paris, 1813.

[2] Op. cit. p. 602.

[3] Compare Stoll: "Ratio Medendi," v. p. 436.

The influence of irritating vapours, or solid particles suspended in the air, in producing inflammation of the pituitary membrane, will be considered under "Traumatic Rhinitis," and the effects of the pollen of certain grasses will be treated of under "Hay Fever." In connection with the action of local irritants, it may be observed that the sensibility of the nasal mucous membrane becomes blunted in the case of the habitual snuff-taker, in whom also the liability to catarrh is diminished.[1]

Occasionally coryza appears to be due to epidemic influences, and several persons in the same house, the dwellers in a particular street, or even the inhabitants of a whole town, may be observed to suffer simultaneously. The supposed epidemic described by Anglada,[2] in which an entire army became suddenly affected with catarrh, is however, probably, only an illustration of the ordinary mode in which cold is caught. The French troops, after spending the greater part of a very hot and dry summer in Andalusia, were caught in a violent storm after a long and fatiguing march. This was immediately followed by an almost universal catarrh.[3] In short, coryza can only be said to occur epidemically, in so far as a sudden lowering in the temperature, with increased humidity of the air, may cause the malady to be widespread.

Although there is a belief among the laity that a cold can be "caught" from a person labouring under the disorder, there is no evidence that coryza is infectious, and it is very doubtful whether it is ever spread by contagion. Immediate contact,[4] especially in kissing, is, however, thought by many to be a common mode of spreading the complaint. Fränkel[1] states that he has seen several cases which appeared to originate in this way. But the only attempt at direct inoculation with which I am acquainted is that of Friedreich,[2] who endeavoured to generate the disorder in his own person, by applying the secretion taken from persons in various stages of coryza to his nasal mucous membrane. The results of this experiment, however, were entirely negative.

---

[1] Plugging the nose with tobacco was formerly thought a good protective against "catching cold." Sir William Temple is said to have kept a leaf of tobacco up each nostril for an hour every morning, in order to drain the secretion from the eyes and head. In this way he fancied that his sight was preserved, at the same time that liability to coryza was diminished. (Sigmond: "Lectures on Materia Medica at Windmill-street.") "Lancet," 1836-37, vol. ii. p. 157.

[2] Op. cit. p. 16.

[3] Cloquet has alluded to an epidemic of coryza among dogs (Stoll: "Ratio Medendi," t. iii. p. 44), and his observations have been repeatedly quoted by subsequent writers. On referring to the original text of Stoll, however, it is clear that the epidemic was one of distemper: "tussis laboriosa, spontaneæ vomitiones, putrilago vomitibus refusa, extrema macies, et tandem veluti quorundam artuum semi-paralysis, et mors."

[4] The belief in the contagious nature of coryza appears to have existed for several centuries. Thus, more than two hundred and

The suppression of habitual discharges is sometimes followed by the development of coryza. Cloquet[3] mentions that the disorder may follow the cure of chronic ophthalmia, the stoppage of bleeding from piles, the cessation of the menstrual flow, or even the disappearance of a rash. I have myself frequently noticed an increased susceptibility to nasal catarrh in delicate women during or immediately after the catamenial period, but I am inclined to consider the occurrence of catarrh under these circumstances to be due to the temporarily lowered vitality which affects the whole system. I have also several times seen coryza follow the cure of chronic otitis.

Nasal catarrh frequently complicates the exanthemata, especially measles, small-pox, scarlatina, and typhus; it also accompanies facial erysipelas, and it is nearly always one of the earliest and most marked symptoms of influenza.[4] In measles there can be little doubt that the congested appearance of the nasal mucous membrane is, in fact, the eruption itself, whilst in scarlatina the coryza seems usually to be caused by an extension of the inflammatory process from the throat. In typhus, the pituitary membrane merely shares in the general catarrhal affection of the mucous tracts.

Nasal catarrh, as a symptom of iodism, is a familiar fact of medical experience.[5]

---

seventy years ago Crato spoke of "coryzæ halitu etiam contagiosæ. Id cum vulgus in Germaniâ sciat, non facile ex eodem poculo, e quo coryzâ laborans potum hausit, bibit." (Johannes Crato in "Epist. Philosoph. Med." Hanoviæ. MDCX. Ep. cvi. p. 188.)

[1] "Ziemssen's Cyclopædia," vol. iv. p. 117.

[2] Loc. cit.

[3] Op. cit. p. 602.

[4] At the commencement of nasal diphtheria, coryza is occasionally present, but, as has been already remarked (Vol. i. p. 185), the actual membrane nearly always forms first in the pharynx, and from thence extends into the nares.

[5] In accordance with the germ theory so much in vogue at the present day, it has been suggested that nasal catarrh may be caused

Symptoms.—A cold in the head is of such every-day occurrence that a very brief description of the symptoms will suffice. Like other disorders of an inflammatory nature, the first indications are those of pyrexia, viz., lassitude, chilliness, and occasionally, but very rarely, a slight rigor. The first sensation, however, which points distinctly to the nature of the attack, is a feeling of fulness and sometimes of throbbing or pain in the frontal region, and this symptom is soon succeeded by paroxysms of sneezing of greater or less severity. In a short time the nares become blocked up from swelling of the mucous membrane, and after a few hours the characteristic state of hyper-secretion is established. The local phenomena relating to the discharge from the nasal mucous membrane are seen in four stages: The lining membrane of the nose is first slightly swollen, then an abundant irritating *watery* secretion takes place, afterwards this becomes *thick* and muco-purulent and loses its irritating quality, and finally the discharge gets thin again, without recovering its irritating properties, and gradually ceases altogether. The time occupied by these various stages differs, some catarrhs passing off in three or four days, whilst others last as many weeks. The duration of the attack principally depends on the length of time which the third and fourth stages occupy; for the dryness of the mucous membrane rarely continues more than a few hours, and the abundant irritating secretion seldom causes trouble for more than one or two days.

The watery fluid of the second stage is decidedly saline, and from its irritating quality it often causes excoriation of the skin about the margin of the nostrils. Together with these symptoms there is usually more or less impairment of the sense of smell. When the *anterior* nares are completely obstructed, the voice has a nasal twang in all its tones, whilst when the stoppage is confined to the *posterior* nares, the general character of the voice is normal, but the articulation

---

by a specific germ. Indeed, Salisbury ("Haller's Zeitschrift," Jena, January, 1873, p. 7) has described and figured this germ under the name of *Asthmatos Ciliaris*. It has also been seen by Ephraim Cutter and P. F. Reinsch ("Virginia Med. Monthly," November, 1878), and, on one occasion, by Daykin, a pupil of Salisbury, who remarks that he had "had a nice time looking at the animal" (see Coomes; "Pharyngeal Catarrh," Louisville, 1880, p. 134). Notwithstanding this confirmation, minute organisms are so common even in healthy secretions that further observations are necessary before the view can be accepted.

is defective, *m* becoming *b*, and *n* being sounded as *d*. Of course, if the obstruction affects the whole nasal passage, both the general and the special defects are present. These points have been explained in connection with post-nasal growths by Löwenberg[1]; and Seiler[2] has recently shown that the peculiar tone of the voice caused by obstruction of the anterior nares is due to the fact that the nasal cavities can no longer act as a reverberating chamber, whilst post-nasal obstruction simply interferes with that free passage of air which is necessary for the articulation of the letters *m* and *n*.

The course of a simple attack of acute nasal catarrh just described in detail is, however, often arrested or modified, and almost any of the symptoms, except the discharge, may be entirely absent.

On the other hand, when the bony cavities communicating with the nose are involved in the catarrhal process, the symptoms are sometimes more troublesome. If the antrum of Highmore becomes affected, there will be severe pain in the cheek, whilst extension to the frontal sinuses causes a dull pain in the forehead, and if the ethmoidal and sphenoidal cells become implicated, the headache becomes intensified. Ringing in the ears and deafness point to temporary blocking up of the Eustachian tube, and the occurrence of epiphora shows that the lachrymal duct is obstructed. Slight but painful abrasion of the nasal mucous membrane near the margin of the nostrils and herpes labialis are often troublesome concomitants. In infants coryza sometimes produces such dangerous symptoms that it will be more convenient to deal with them separately (see p. 293).

Diagnosis.—An ordinary catarrh can scarcely be mistaken for any other affection, but it must be remembered that it is sometimes a premonitory symptom of some acute specific disease, and when there is much conjunctival inflammation the likelihood of the development of measles should be borne in mind. Still more rarely nasal catarrh may simulate disease of the bones. Thus Peter[3] relates a case in which there was such severe pain in the brow at the outset that the complaint was regarded as one of "acute caries" of the frontal bone, but on the application of a poultice to the root of the nose a profuse discharge was established, which almost instantly relieved the pain and proved the case to be one of coryza.

---

[1] "Tumeurs adénoïdes du Pharynx nasal." Paris, 1879, p. 26.

[2] "Archives of Laryngology." January, 1882, vol. iii. No. 1, p. 21.

[3] Quoted in the article on "Coryza" in the "Dict. Encyclop. des Sci. Méd." Paris, 1878, t. xxi. p. 3.

Prognosis.—In the great majority of cases complete recovery takes place, and it is only in old people and very young children that coryza is attended with any danger: but it may terminate in chronic catarrh with much thickening of the mucous membrane, or it may lead to the development of polypi.

Pathology.—The process is essentially one of active congestion of the pituitary membrane followed by serous exudation. The fluid is stated by Cornil and Ranvier[1] to contain lymph-corpuscles from the outset, and epithelial cells are found in increasing numbers as the catarrhal condition advances, the discharge being thus rendered at first cloudy and afterwards opaque. The mucous membrane is red and tumid, and numerous small tortuous vessels are often visible; whilst here and there dark brown stains, caused probably by submucous ecchymosis, may sometimes be seen with occasional abrasion or slight ulceration of the mucous membrane.

Treatment.—Though from an early period it has been a constant reproach to medical practitioners that they are unable to cure a "common cold," the blame really rests with the patient more than with the physician. For as a rule, persons suffering from catarrh feel so little inconvenience that they are unwilling to submit to the restraint and regimen which are necessary to ensure rapid recovery. The disorder may be treated by *stimulants*, by *derivatives*, or by one of the many remedies, the action of which is too obscure to permit of classification. Of all stimulants opium is the most trustworthy. The older physicians recognized its value in stopping a catarrh, and generally gave it in the form of Dover's powder at bedtime, but the effect of the drug is much greater if administered in small doses during the day. Laudanum is better than any other preparation, and five or seven drops taken at the commencement of an attack will often cure it at once. The remedy acts more quickly and more certainly if taken on an empty stomach, and if one dose is not sufficient it may be repeated twice in the day at intervals of six or eight hours. If at the end of two days the catarrh still persists it is useless to try to cut it short. Opium may also be administered in the form of a snuff containing morphia and bismuth as first recommended by

---

[1] "Manuel d'Histologie pathol." Paris, 1869, pp. 653, 654.

Ferrier[1] (see Appendix). The patient ought to commence taking the snuff as soon as the symptoms of coryza begin to show themselves, and at first it should be employed frequently so as to keep the interior of the nostrils well coated. Each time the nose is cleared another pinch should be taken. This powder may also be administered by blowing it into the nasal cavities with Bryant's auto-insufflator. (Fig. 37, p. 256).

Camphor has long been held in high esteem by the public as a "certain cure" for incipient catarrh, and many persons find that ten drops of spirits of camphor taken on a piece of sugar at once arrests a cold.

Instead of employing medicines which control secretion by acting through the nervous system, local stimulants may be prescribed in the form of inhalations. In Germany a preparation known as Hager-Brand's "Anti-catarrhal Remedy,"[2] and consisting of ammonia and carbolic acid, is largely used as a household remedy (see Appendix). The vapour of a few drops of this nostrum, poured into a small cone of blotting-paper, should be inhaled till the liquid is evaporated, and this may be done every two or three hours until relief is obtained, or the inefficacy of the remedy proved. "Alkaram," so extensively advertised in this country, appears to contain the same ingredients. I have often seen great benefit result from smelling strong ammonia salts without the addition of carbolic acid. These "olfactories" should only be employed at the moment when a disposition to sneeze is felt, for at other times they will often increase the catarrh by provoking an attack of sneezing. In some persons the inhalation of iodine vapour acts favourably, and will cut short a catarrh in a few hours. "The inhalation of chloroform to the induction of anæsthesia administered after the patient has been put to bed will often be found adequate," says Solis Cohen,[3] "to abort a cold by its relaxing influence upon the structures which are in a state of tension." Although I do not in the least doubt the efficacy of this plan, it is obviously too risky to be adopted, unless under very exceptional circumstances.

Derivative treatment may be carried out by the administration of diaphoretics, diuretics, or purgatives. James's powder, of which the pulvis antimonialis of the British

---

[1] "Lancet," April 8, 1876.

[2] "Wien. med. Wochenschrift," June 5, 1872.

[3] "Diseases of the Throat and Nasal Passages." New York. 1879, 2nd ed. p. 336.

Pharmacopœia is an imitation, was once a very popular remedy in England. If used, two grains should be given every three or four hours until diaphoresis is established. A mixture, consisting of five grains of nitrate of potash, twenty drops of spiritus ætheris nitrosi, and two drachms of liquor ammoniæ acetatis is a time-honoured remedy. If such medicaments are administered the patient should at the same time use the familiar adjuvant of a hot foot-bath. It need scarcely be added that if this form of treatment be adopted the patient should be confined to the house, or even kept in bed. His diet should be light, and alcoholic stimulants should be avoided, the only exception being a glass of hot spirits and water at bed-time. Diaphoresis may be carried out in a more energetic way by means of Turkish baths, a method which has the advantage of not preventing the patient from pursuing his ordinary avocations.

The late Addington Symonds, of Clifton, widely known as a most accomplished and experienced physician, strongly recommended[1] the following pill and draught as a means of preventing nasal catarrh from running into bronchitis: ℞. Extr. Hyoscyami, Pulv. Conii, aa. gr. iv.: Calomel, Pulv. Ipecac., aa. gr. j. M. ft. pil. ii. vespere sumendæ. This was followed by a draught in the morning consisting of Rochelle salts (tartrate of soda) and senna, and the patient was kept in bed half the following day.

Small doses of aconite have been recommended for catarrh, but I have frequently tried this remedy in cases where the coryza was accompanied by high temperature, and have never been able to satisfy myself that it produced any appreciable effect in cutting short an attack.

In conclusion it may be mentioned that total abstinence from liquids, as was pointed out by Richard Lower,[2] and more recently by C. J. B. Williams[3] will generally quickly check catarrh. The coryza begins to diminish in about twelve hours, and a cure is usually effected in two days. Williams allows, without recommending, a tablespoonful of milk or tea twice in the day, and a wine-glass of water at bed-time. The system should be put in force at the very outset of a catarrh.

[1] "Ranking's Abstracts." 1868, vol. i. p. 55.

[2] "Dissert. de Origine Catarrhi." Ed. quinta, Lugduni Batavorum, 1708, cap. vi. p. 258.

[3] "Cyclopædia of Pract. Med." London, 1833, vol. i. p. 484.

ACUTE CORYZA IN INFANTS.

It is a matter of familiar observation that the nose is relatively smaller than the other features in newly-born children, but it is only recently that the peculiar anatomical condition of the nasal fossæ in infants has been distinctly described. To Kohts and Lorent[1] we are indebted for showing that in these young subjects the meatuses are exceedingly narrow, the free extremity of the inferior turbinated bone being, as compared with that in the adult, longer and curved further round, so that scarcely any room is left for a passage at all. The relative smallness of the passages, however, is most marked in the middle meatus, its direction being quite horizontal, and its anterior orifice being only an exceedingly minute circular opening. During adolescence this round aperture enlarges anteriorly and at the upper part, resulting in a kind of crook-shaped curve, which greatly increases its size. Now it appears from the observations of Kussmaul[2] that the mouth in newly-born children is almost always closed during sleep, that the tongue is brought into contact with the hard palate, and that thus even in those rare cases where the lips are open no air passes through the mouth. Bearing in mind the anatomical conditions of the nose in infants which have just been described, it can easily be understood that a very slight swelling of the pituitary membrane is likely to be attended with considerable difficulty in breathing, a circumstance which J. P. Frank[3] was the first to recognize. No sooner does the child suffering from severe catarrh fall asleep than it is apt to be attacked by a paroxysm of dyspnœa, and the attempts to inspire under these circumstances may lead to extreme pulmonary engorgement. The difficulty of breathing is, according to Bouchut,[4] sometimes greatly intensified by the tongue being drawn down and blocking up the laryngeal orifice in the same manner as it does occasionally under the influence of an anæsthetic. These attacks frequently resemble laryngismus stridulus, or may even be mistaken for laryngitis. But there is another danger, viz., that of starvation, for the child may be unable to suck without risk of suffocation on account of the obstructed state of its nasal passages. Although, however, infants are liable to these perils it must be admitted that they are very rarely encountered in practice.

---

[1] "Handb. d. Kinderkrankheiten," von Prof. Gerhardt. 1878. Dritter Band, Zweite Hälfte, p. 4, et seq.

[2] "Zeitschrift f. rationelle Medicin." 1865, p. 225.

[3] "De curandis hominum morbis." Mannhemii, 1794, lib. v. pars i. p. 107.

[4] Quoted by Fränkel, "Ziemssen's Cyclopædia," vol. iv. p. 106. On this interesting subject see also Henoch ("Beiträge z. Kinderheilk. Berlin, 1868, p. 124) and Hauner ("Jahrb. f. Kinderheilk." 1862, vol. v. p. 73).

Most of the remedies recommended for adults may be used in reduced doses, but opiates should never be administered. A small open tube put through the nose will sometimes enable the child to suck easily; but should this plan not answer, the infant must be taken from the breast and fed with its mother's milk by means of a spoon, and as a last resource a short œsophageal tube (Fig. 11, p. 24) must be used.

PURULENT NASAL CATARRH.

Purulent inflammation of the nasal mucous membrane, in exceedingly rare cases, may be simply an aggravation of an ordinary acute catarrh. It may likewise result from injuries or from the prolonged presence of foreign bodies; but in this article it will be briefly referred to as an acute affection in which the formation of pus is the distinguishing feature from the outset. Purulent nasal catarrh may be met with both in newly-born children and in adults. In the former case it is generally thought that the inflammation results from infection of the mucous membrane of the nose with the leucorrhœal discharge which frequently occurs in the last months of pregnancy, or in some still rarer instances from gonorrhœa, from which the mother may have been suffering at the time of parturition. It is extremely doubtful, however, whether such catarrhs are really the result of maternal infection—the sudden exposure at birth of the delicate mucous membrane to the irritating influence of the atmosphere, or the entrance of soap into the nostrils in careless washing, being sufficient to account for the occasional occurrence of the complaint. It may be added that the influence of vaginal discharges upon the mucous membrane of the eyes and nose of infants in the act of birth has yet to be investigated on a large scale. If sufficient statistical evidence can be obtained to show that the children of women suffering from such discharges are often affected with purulent ophthalmia or rhinitis, whilst the infants of women free from leucorrhœa show no signs of such inflammations, the question will be settled. At present the weight of opinion is no doubt in favour of the theory of contagion at the time of birth; but this view rests more on *a priori* grounds than on statistical evidence. Hermann Weber,[1] however, has reported a case in which it is probable that direct contagion occurred. The mother had suffered during the last weeks of gestation from an abundant yellowish discharge from the vagina, and the child, *which had not been washed for three hours after birth*, was subsequently attacked with purulent inflammation of the left eye and of the nostrils, the nose being swollen and stuffed up with crusts. The nasal discharge varied somewhat in character, being sometimes watery, sometimes thick and yellow, and sometimes mingled with blood.

There are very few cases on record in which purulent nasal catarrh has resulted from gonorrhœal infection in adults. The only instances which I have been able to find in medical literature are the three following: Boerhaave[2] relates that a patient of his own, after squeezing some matter out of his urethra for the inspection of the surgeon, thoughtlessly put his fingers immediately afterwards into his nose. Very severe rhinitis ensued, followed by extensive ulceration. Another case is related by Edwards[3] in which an elderly woman consulted him for inflammation of the nose with purulent discharge which had excoriated the upper lip. The patient suffered so much pain and was so emaciated and ill that the disease was suspected to be malignant ulceration of the nasal cavity. Edwards, however, on inquiring into the history of the case, ascertained that about six months previously the woman had wiped her nose with a handkerchief which had been employed as a suspensory bandage by her son, who was suffering from gonorrhœa at the time. Five days after this occurrence the patient's nose became violently inflamed. She was treated with iron and quinine internally, and the nasal fossæ were washed out with tepid water, after which a mildly detergent lotion was used. Edwards, in commenting on the case, affirms that he has known several instances where patients suffering from gonorrhœa had infected their own nostrils by carelessly touching them with their fingers, but this was the first case in his experience in which another individual had been so inoculated.[1] A revolting example of direct infection of the nasal mucous membrane has been reported by Sigmund,[2] in which a man contracted purulent rhinitis from introducing his nose into the vagina of a prostitute suffering from gonorrhœa.

---

[1] "Med.-Chir. Trans." 1860, vol. xliii. p. 177.

[2] "Tractatio med. pract. de lue venereâ." Lugd. Batavorum, 1751, p. 41.

[3] "Lancet," April 4, 1857.

An attack of purulent inflammation of the nose is usually ushered in by some degree of systemic disorder, such as shivering and general febrile symptoms. In Edwards's case, quoted above, these were very severe. Excoriation and ulceration are almost always produced by the discharge, especially at the edges of the nostrils, and on the upper lip. The inflammatory process is also apt to invade the eyes, if indeed the conjunctiva is not simultaneously infected. In infants the nose may be so plugged up by thickened secretion that respiration by that channel is rendered impossible, and thus the troublesome consequences described in the last article are likely to follow.

The *treatment* should consist in cleansing the parts with a tepid alkaline spray or collunarium (*see* Appendix). Afterwards the nasal cavities should be syringed out with some mildly astringent injection such as alum (gr. v. ad ℥j.), sulphate of zinc (gr. ij. ad ℥j.), sulphate of copper (gr. ij. ad ℥j.), or nitrate of silver (gr. j. ad ℥j.). In the case of infants the injections into the nose often give rise to violent attacks of coughing, owing to some of the fluid getting into the larynx. Under these circumstances it will be found convenient to use the "Temporary Sponge-Tampon" (p. 283) whilst douching or syringing is being carried out. Where there is difficulty of sucking from stoppage of the nose, the little patient should be fed in the manner recommended under "Acute Coryza in Infants" (p. 294).

TRAUMATIC RHINITIS.

Irritating vapours, or solid particles suspended in the atmosphere, frequently produce catarrh, and no doubt many otherwise inexplicable cases of coryza are due to this cause. It can be readily understood that the vapours of chlorine, ammonia, and iodine are extremely likely to set up irritation of the nasal mucous membrane. The influence of more palpable irritants is seen in the case of millers, ivory-turners, sawyers, brush-makers, and persons engaged in kindred employments. It is remarkable, however, that the nasal mucous membrane does not generally seem to suffer in the same way as the pharynx from exposure to hot steam or smoke (Vol. i. p. 101).

---

[1] Chelius ("System of Surgery." Eng. Transl. London, 1847, vol. i. p. 177) mentions purulent rhinitis as an occasional *concomitant* of gonorrhœa, and his translator, South (Ibid. note to paragraph 168), quotes two examples of such an occurrence from Benjamin Bell.

[2] "Wien. med. Wochenschrift." 1852, p. 572.

In addition to casual sources of irritation there are certain substances which when present in the atmosphere, produce a specific effect on the lining membrane of the nose, and amongst these bichromate of potash, arsenic, and mercury may be particularly mentioned; whilst osmic acid is stated by Seiler[1] to be an irritant of such strength as to be capable of producing coryza within one or two hours. Attention was first drawn to the influence of bichromate of potash by Bécourt and Chevallier,[2] who noticed that certain effects were produced on the workmen exposed to the steam from the boilers in which that substance is made. The subject was afterwards taken up and investigated by Delpech and Hillairet,[3] who found that similar effects were produced on persons exposed to the dust of the yellow chromate, although they were manifested less rapidly, and in a much slighter degree than in the case of the bichromate vapour.

The first *symptoms* produced by the bichromate are a tickling sensation in the nose, violent sneezing, and an abundant discharge, which at the commencement is watery in character, but soon becomes thick and green. At a later period the discharge contains crusts, and even flakes of sloughing mucous membrane, but it is never offensive. Epistaxis not unfrequently occurs, and ultimately portions of cartilage are expelled. Perforation always takes place at a level of one and a half, or at most two centimetres above the lower edge of the septum. At first the aperture is round, and very small, but as it increases in area it becomes oval in shape. It may thus extend to the junction of the cartilage with the vomer and the perpendicular plate of the ethmoid. As the lower and anterior part of the cartilage always remains intact, the bridge of the nose never falls in. Ulcers occu sionally form on the turbinated bodies, but they are not nearly so severe as on the septum.

---

[1] "Diseases of the Throat." Philadelphia, 1883, 2nd ed. p. 201.

[2] "Annales d'Hygiène," Juillet, 1863, t. xx. p. 83.

[3] Ibid. 1869, t. xxxi.

Casabianea[1] points out that the reason why the septum particularly suffers, is that, owing to the shape of the nostrils, the columns of inspired air, on entering the nose, first strike against that part; whilst the mucous membrane in that situation being much less rich in glandulæ than that of the external wall, is not so well protected by secretion. The rapidity with which perforation occurs is due to the thinness of the mucous covering, which leads to its speedy destruction by ulceration, coupled with the fact that the cartilage itself receives its vascular supply solely from this source, and therefore necessarily loses its vitality as soon as the membrane is destroyed.

Snuff-takers seem to be exempt from the disease, and those who have once suffered from it afterwards enjoy immunity from common catarrh.

Delpech and Hillairet[2] have reported four cases of an analogous nature, in which perforation of the septum occurred in individuals exposed to arsenical dust, principally those who worked with "Schweinfurth green." The same thing has been noticed among makers of artificial flowers and wall papers. Ulcerations of the nasal mucous membrane have also been observed[3] among those who use bichloride of mercury in dyeing feathers and silvering mirrors.

The poisonous effect of these materials in such cases is no doubt purely local, and is not the result of constitutional absorption.

All persons employed in trades which cause the nasal mucous membrane to be exposed to deleterious matters should wear plugs of cotton-wool in their nostrils. Although when perforation has once taken place it is difficult to prevent the formation of a tolerably large hole in the septum, the morbid action is strictly confined to a small area, beyond which its ravages never extend. The use of simple sprays will soon restore the surrounding mucous membrane to a fairly healthy condition.

[1] "Des Affections de la Cloison des Fosses nasales." Paris, 1876, p. 42.

[2] Loc. cit.

[3] Casabianca: Op. cit.

HAY FEVER.

(SYNONYMS: HAY ASTHMA. SUMMER CATARRH. ROSE CATARRH.)

Latin Eq.—Catarrhus æstivus.
French Eq.—Catarrhe d'été. Catarrhe de foin.
German Eq.—Frühsommer-Catarrh. Heu-Asthma.
Italian Eq.—Asma dei mietitori.

DEFINITION.—*A peculiar affection of the mucous membrane of the nose, eyes, and air-passages, giving rise to catarrh and asthma, almost invariably caused by the action of the pollen of grasses and flowers, and therefore prevalent only when they are in blossom.*

History.—The first detailed account of hay fever was given by Bostock,[1] who, in 1819, described a "periodical affection of the eyes and chest," from which he was himself a sufferer. In 1828[2] this physician published some further observations of the complaint, under the name of "summer catarrh." A short paper on hay asthma, by Gordon,[3] appeared in 1829, and in 1831 Elliotson[4] gave a brief description of the complaint. A few years later the same physician[5] discussed the subject more fully, and with characteristic sagacity pointed to pollen as the probable cause of the affection.

A systematic inquiry into all the circumstances of the disease was made in 1862 by Phœbus,[6] of Giessen, whose own personal observation of the disease was, however, confined to a single case. Unlike most of the other writers upon the subject, moreover, he did not himself suffer from the complaint. His method consisted in issuing circulars and advertisements inviting medical men all over the world to send him answers to a series of questions so framed as to embrace every possible kind of information about the causes, symptoms, and progress of the disorder: its periods of prevalence, geographical and ethnological distribution; and its prevention and treatment. In this manner a vast quantity of facts and observations was collected, and from these Phœbus endeavoured to extract a complete theory of the disease. During the ensuing ten years pamphlets on hay fever were published by Abbott Smith,[7] Pirrie,[8] and Moore,[9] dealing with the disorder from various points of view, but all, more or less, showing a disposition to limit the cause of its development to emanations from plants.

---

[1] "Med.-Chir. Trans." London, 1819, vol. x. Pt. i. p. 161, et seq.
[2] Ibid. vol. xiv. pt. ii. p. 437, et seq.
[3] "London Med. Gazette." 1829, vol. iv. p. 266.
[4] Ibid. 1831, vol. viii. p. 411, et seq.
[5] "Lectures on the Theory and Practice of Medicine." London, 1839, pp. 516–527.
[6] "Der typische Frühsommer-Katarrh." Giessen, 1862.
[7] "Observations on Hay Fever." London, 1865, 2nd ed.
[8] "Hay-Asthma." London, 1867.
[9] "Hay-Fever." London, 1869.

In 1869 a theory of hay fever was propounded by Helmholtz,[1] who was himself a sufferer from the complaint. He held that the symptoms were produced by vibrios, which, although existing in the nasal fossæ and sinuses at other times, were excited to activity by summer heat. He professed to have found a ready means of relief and even of prevention in the injection of quinine, which Binz had shortly before shown to be poisonous to infusoria. Subsequent experience has not confirmed Helmholtz's conclusions. In the following year a short practical paper was published by Roberts,[2] in which he claimed to have been the first to observe that excessive coldness of the tip of the nose is "*the* pathognomonic" symptom of hay fever, and desired to have due credit awarded for the discovery. In 1872 Morrill Wyman[3] discussed the disease as it prevails in America, and tried to establish that two distinct forms of the complaint exist in that country—one occurring in May and June, and corresponding to English hay fever, and a later variety peculiar to America, which he called "Autumnal Catarrh." In 1873 Blackley,[4] of Manchester, published a work which is a model of scientific investigation. By a most ingenious and carefully conducted series of experiments he proved that in his own person at least the pollen of grasses and flowers was the sole cause of hay fever, and that in the case of two other patients the severity of the disease bore a direct relation to the amount of pollen in the air. His subsequent observations make it extremely probable, indeed almost certain, that though transient irritation of the mucous membrane may occasionally be caused by simple dust, pollen is in fact the true *materies morbi* of summer catarrh. In 1876 a short treatise was published by Beard,[5] of New York, in which he dealt with the complaint as it is met with in the United States. His information was collected chiefly by circulars after the manner of Phœbus, but more fortunate than that observer, Beard had himself seen and treated many cases. He received replies from over two hundred patients, and on these data he came to the conclusion that the immediate exciting causes are more than thirty in number, and that further investigations may extend the number of secondary causes to fifty or even a hundred. Beard showed clearly from his statistics that a large proportion of the sufferers are of nervous temperament, and that nerve-tonics are of considerable value in the treatment of the affection. In 1877 an essay was published by Marsh,[6] in which he completely accepts the pollen theory. The influence of a morbid condition of the nasal mucous membrane in favouring the development of hay fever has been recently insisted on by Daly,[7] Roe,[8] and Hack.[9]

---

[1] Binz: "Virchow's Archiv." February, 1869.

[2] "New York Med. Gaz." Oct. 8, 1870.

[3] "Autumnal Catarrh." New York, 1872.

[4] "Hay-Fever." London, 1873, and 2nd edit. 1880.

[5] "Hay-Fever, or Summer Catarrh." New York, 1876.

[6] "Hay-Fever, or Pollen-poisoning." Read before the New Jersey Medical Society, 1877.

[7] "Archives of Laryngology." 1882, vol. iii. p. 157.

[8] "New York Med. Journ." May 12, 1883.

[9] "Wien. Med. Wochenschrift." 1882-83.

Etiology.—In accordance with the usual method, the causes of hay fever may be conveniently divided into (*a*) predisposing and (*b*) exciting.

a. The predisposing cause of the complaint is the possession of a peculiar idiosyncrasy, but on what that idiosyncrasy[1] depends is quite unknown. Whether it is due to some local abnormality affecting the structure of the mucous membrane, the capillaries, or the periphery of the nerves, but of too delicate a nature to admit of detection by available methods of research, cannot be determined. The fact, however, remains, that whilst millions of people are exposed to the cause of the affection very few suffer from it. The idiosyncrasy is generally suddenly developed without apparent reason. Once acquired, however, it is seldom lost, the predisposition seeming rather to increase with each recurring summer. The circumstances which are supposed to influence this idiosyncrasy are *race*, *temperament*, *occupation*, *education*, *mode of life*, *sex*, *heredity*, and *age*. These various points may, with advantage, be considered in detail.

The influence of *race* is seen in the fact that it is the English and Americans who are almost the only sufferers from the complaint. In the north of Europe—that is, in Norway, Sweden, and Denmark—it is scarcely ever seen, and it rarely affects the natives of France, Germany, Russia, Italy, or Spain. In Asia and Africa, also, it is only the English who suffer. As far as I have been able to ascertain, the complaint is more common in the south of England than in the north; whilst in the north of Scotland it is very rare. In America it occurs in nearly every State, though diminishing in frequency towards the south. I think it extremely likely that the disorder will be found in Australia and New Zealand, but I am not aware that any cases have yet been reported from those countries. In support of the view that race has an important influence, Beard mentions that Dr. Jacobi, whose practice in New York lies largely among Germans, has never met with a case of hay fever in a patient of that nationality, and that Dr. Chaveau, of the same city, has never observed the complaint among his French compatriots residing there. Beard himself never heard of a case amongst Indians or negroes, except the instance related by Wyman, in which an Indian child was the subject of the disease.

---

[1] In this respect the idiosyncrasy is like idiosyncrasies in general. The existence of these personal peculiarities is too well known to require much comment. Many people cannot eat crabs, lobsters, or strawberries without being attacked with urticaria. Others, again, cannot eat mutton or white of egg without being sick. One of the most interesting cases of idiosyncrasy, and peculiarly appropriate to the present subject, inasmuch as it was brought into operation through the nasal mucous membrane, was that of Schiller, to whom the smell of rotten apples was so beneficial that he could not "live or work without it" (Lewes: "Life of Goethe." London, 1864. 2nd ed. p. 381).

The nervous temperament has undoubtedly a certain influence in predisposing to hay fever. This, of course, does not mean that all the patients are highly nervous people; some are of nervo-bilious, others of nervo-sanguineous temperament, but nearly all belong to the active, energetic class of so-called nervous organization.

One of the most singular features of this complaint is, that it is almost exclusively confined to persons of some *education*, and generally to those of fair social position. Whilst I have notes of sixty-one cases of hay fever from my private practice,[1] and have seen many others of which I have kept no record, I have not met with one amongst my hospital patients. Of forty-eight cases which came more or less directly under the notice of Blackley, every one belonged to the educated classes; whilst out of fifty-five cases reported by Wyman, in forty-nine the patients were educated people. The influence of the *mode of life* is shown in the fact that the rustic is much less subject to the affection than the citizen. Thus farmers and agricultural labourers, who of all people are most exposed to the disease, very rarely suffer from it, there having been only seven cases among the two hundred reports collected by Beard. It is not possible to tell whether the villager owes his exemption to the vigorous health maintained by an outdoor life, or whether habitual exposure to the cause of the complaint begets tolerance; but the fact remains, that dwellers in towns are much more prone to the affection than those who live in the country.

Sex has a distinct influence, many more men than women suffering from the disease. Out of a grand total of 433 cases cited by Phœbus, Wyman, and Beard, only 142, or about a third, were females. Against these statistics it may be urged that the information on which they are based was collected by circulars, to which, perhaps, women would be less likely to reply than men. This objection, however, does not apply to my own cases, amongst which I met with thirty-eight belonging to the male and only twenty-three to the female sex.

---

[1] This was written in 1879.

Heredity has likewise a powerful influence. This has been abundantly proved by Wyman and Beard, and it is supported by my own observations. In Wyman's experience there was heredity in 20 per cent. and in Beard's in 33 per cent. Out of my sixty-one cases, in twenty-seven one or more near relatives had suffered in the previous generation. I have also several times treated father and children at the same time.

Age to some extent governs the disorder. In the great majority of cases the liability to hay fever appears before the age of forty; but several instances have been reported of the first occurrence of the malady in patients as old as sixty. It is somewhat rare for this affection to show itself in very young children, but I have seen it in one patient at two years of age, and in another at three. In these cases, as in all those of very young patients that have come under my notice, the little sufferers were the children of parents who had themselves been victims to the complaint. Had not the parents been subject to the affection, it is most likely that the true import of the symptoms would not have been recognized in the children, but would have been attributed to a common cold.

b. Exciting Causes.—A great variety of agencies have been looked upon as the direct causes of this disease, but there can now be little doubt that *pollen is the essential factor in the case of those who possess the peculiar predisposition.* Before, however, proceeding to show that pollen is the real cause of the affection, it may be well to pass in review some of the other sources to which its origin has been attributed. The most important of these are heat, light, dust, benzoic acid, coumarin, excess of ozone, and over-exertion, or several of these influences in combination.

Heat.—Popular observation had already associated hay fever with effluvia from grass or hay, at the time when Bostock, from his own personal experience, put forth the view that the affection was due to the influence of solar heat. The obvious difficulties in the way of this theory led Phœbus to attribute the affection to "*the first heat of summer*," which, he observed, "is a stronger cause than all the grass emanations put together." Later on, however, Phœbus remarked that "the first heat of summer only acts in an indirect manner as an exciting cause;" and he admitted that hay and the blossom of rye cause exacerbations. Heat alone will not, however, produce the disease. It is not met with in the plains of India when the heat is greatest, though occasionally it is seen in the cooler months before the vegetation is burnt up. Hay fever is also found in the milder climate of the Indian hills, when the grasses and cereals are in blossom. The intense heat of the desert does not produce the disease, nor does it occur at sea in the sultry equatorial regions, though the heat when vessels are becalmed, is sometimes almost beyond endurance. In America, hay fever is much more common in autumn than in the tropical summer of that country.

Light.—The observations as regards heat apply equally to light. Phœbus thought that the *longer days*, which produce a more continuous action of light, are perhaps to blame; but where the light is strongest and lasts longest, indeed in the land of "the midnight sun," hay fever is almost unknown. At sea, when the sun is bright, it is well known that nothing can exceed the glare; yet a sea-voyage is the best safeguard for the sufferer from hay fever. Persons with a sensitive mucous membrane, especially those subject to hay fever, are no doubt sometimes liable to attacks of sneezing from sun-light, and incautious observers might mistake these symptoms for true hay fever. Some of Beard's patients even attributed the affection to gas-light, but gas-light is used much more in winter when hay fever is absent, than in the English summer and American autumn, when the affection prevails.

Dust.—This is a more difficult subject to dispose of. Most writers who accept dust as a cause of summer catarrh, speak of "common dust," but as Blackley remarks, there is no such thing as *common* dust. The constitution of dust depends upon the geological character of the soil, upon the vegetation which it supports, and on the season of the year, as well as on "the number and kind of germs and other organic bodies" present in the atmosphere. Beard's statistics, if accepted without consideration, strongly point to dust as the most common cause of hay fever, for out of 198 patients no less than 104 attributed the affection to dust. Of these 198 cases, however, 142 occurred between May and September; and it may well be asked: How was it that dust did not affect these patients in the winter months? Does this not clearly point to the presence in the dust of some special irritant during the summer and autumn months, which does not exist at other times? In England, in the months of February, March, and April, when strong east winds often blow clouds of dust against the face, symptoms of hay fever do not appear, whilst in June and July, when there is comparatively little dust, hay fever attacks its victims. It is true that in many of Beard's cases, collected by circulars, the patients attributed the affection to "indoor dust," and some even to "cinders." But as people stay in the house more in winter than in the autumn and summer, and use fires at that time, these agencies, if of any real power, would produce their greatest effect in winter. Directly the opposite, however, occurs. Is it not highly probable, therefore, that these patients were misled as to the real cause of the malady? We all know how easy it is for the trained physician to make erroneous observations and to overlook important physical signs, and how much more likely is the untutored patient to make a mistake in the obscure and highly complicated problems of etiology!

Ozone, Benzoic Acid, &c.—An excess of ozone in the atmosphere was suggested by Phœbus as a possible cause of hay fever, but Blackley purposely breathed air highly charged with this substance for five or six hours without effect. He, moreover, inhaled artificially prepared ozone, in quantities far exceeding what is ever found in the same volume of atmospheric air, without feeling any inconvenience. The same physician also studied the effects on his own person of benzoic acid,[1] coumarin (the odorous principle of many flowering grasses), and of the volatile oils which impart to many plants, such as peppermint, juniper, rosemary, and lavender, their characteristic perfume. The results were in all these cases entirely negative.

Over-exertion, or prolonged exercise in the open air, never has any effect in cold weather, or indeed at any other time except when grass is in flower. Its influence, however, in *aggravating* hay fever, in the hay season, is very great, and will presently be considered.

Combined Causes of Hay Fever.—Several writers have contended that although any one of the above causes may not alone be sufficient to produce hay fever, several of them acting together may be able to do so. Such theories are the last resource of those who are unable to discover the true etiology, and there is not a tittle of evidence in their support.

Having shown what does *not* generate hay fever, its real mode of origin must now be demonstrated.

---

[1] This substance has been shown by Vogel to be contained in *anthoxanthum odoratum* and *holcus odoratus*, the two species of flowering grasses to which the causation of hay fever has been in a special manner attributed.

Blackley's observations leave no doubt that the cause of hay fever is *the action of pollen on the mucous membrane.* His experiments were framed on a most comprehensive plan, and carried out in a rigorously scientific spirit. By well-devised tests he succeeded in proving—1st, that in his own person the inhalation of pollen always produced the characteristic symptoms of hay fever; 2ndly, that in his own case, and in that of two other persons, there was a direct relation between the intensity of the symptoms and the amount of pollen floating in the air; and 3rdly, as already shown, that none of the other agents referred to, such as heat, light, dust, odours, or ozone, can of themselves cause the complaint.

Blackley's experiments were made with pollen of various grasses and cereals, and with that of plants belonging to thirty-five other natural orders.

The grasses which, as already stated, were at one time considered to be especially active are the *anthoxanthum odoratum* and the *holcus odoratus*, but this idea no doubt originated in the extremely fragrant odour of these plants, and there is no reason to suppose that their pollen is more active than that of the *alopecurus pratensis*, and the various *poæ* and *loliæ*. The pollen of rye is, however, more potent than some of these, and that of wheat, oats, and barley is also very active. The careful observations of Blackley show that in England, during the season of hay fever, ninety-five per cent. of the pollen contained in the atmosphere belongs to the *graminaceæ.* This order generally comes into full blossom between *the end of May and the latter part of July,* and that is precisely the period of the year when hay fever prevails. If the season be wet and cold the disease usually sets in rather later, and is milder in character than when the weather is fine, and the vegetation luxuriant.

There are persons in whom the presence of roses will give rise to an attack, and in America the affection is sometimes called "rose fever." No doubt it is the pollen of the rose which is the active agent. The celebrated Broussais[1] appears to have been impeded in his botanical studies by this idiosyncrasy, whilst the case related by Hünerswolff[2] of a man in whom the perfume of roses invariably produced an attack of coryza, has been often cited by modern writers. I have myself met with a similar case. A lady living in Devonshire consulted me in 1864, on account of constant severe coryza, which came on whenever she smelt a rose. All treatment proved futile, and she was ultimately obliged to banish these flowers from her garden.

In America the pollen of the Roman wormwood (*ambrosia artemisiæfolia*) appears to be the most common cause of hay fever. This plant (which belongs to the genus *ambrosiaceæ*, order *compositæ*) is not met with in Europe, but is extremely common in nearly every part of the United States. Wyman[3] found that when a parcel containing this plant was opened at White Mountain Glen, where he had retired in order to avoid hay fever, he and his son were immediately attacked with all the symptoms of the malady. *The plant blossoms in August and September, and it is then that hay fever most prevails in America.* Several varieties of the *artemisiæ*, a closely-allied genus, are met with in England, and I think it not improbable that some cases of hay fever which have occurred at the seaside in this country may have been due to the pollen of the *artemisia maritima*, or its variety, *artemisia gallica*. It is curious that, except in the case of Indian corn, the pollen of *grasses* appears to have but slight effect in America, though a mild form of hay fever is met with in that country from May to August.

---

[1] Anglada: "Du Coryza simple." Thèse de Paris, 1837, p. 14.

[2] "Ephem. Nat. Curios," dec. ii. ann. v. obs. xxii.

[3] Op. cit. p. 101.

There are certain supposed fallacies in the pollen theory which must be referred to. Thus a case is mentioned by Walshe,[1] in which the patient retained the symptoms of hay fever during a passage across the Atlantic, and another has been reported by Abbott Smith,[2] in which the disease came on at a distance of nine miles from land. These are, I believe, the only authenticated instances in which hay fever has continued to exist, or has originated at sea, and they are open to various explanations. It has been distinctly shown by Blackley that pollen may be retained in an article of dress for many weeks, and in Smith's case, the patient, who was yachting, experienced the symptoms after assisting "to hoist the sails." The attack came on on the 13th of June, and it is not unlikely that when the sails were unfurled a large quantity of pollen collected in their folds was set free. In Walshe's case, the symptoms may have been kept up by some other irritant to which the patient may have had a peculiar susceptibility, or the case may not have been a true example of hay fever, but of ordinary asthma, complicated with catarrh. It is not altogether impossible, however, that pollen may be deposited on a ship miles away from land. Darwin[3] has shown that dust is sometimes thus deposited far out in the Atlantic. "The dust," he observes, "falls in such quantity as to dirty everything on board and to hurt people's eyes; vessels have even run on shore owing to the obscurity of the atmosphere." Again, in speaking of the distribution of pollen, Darwin reminds us that the ground near St. Louis, in Missouri, has been seen covered with pollen as if it had been sprinkled with sulphur, and there is good reason to believe that this had been transported from the pine forests at least 400 miles to the south.[4] A shower of yellow pollen was wafted to Philadelphia[5] from some distant pine forest so recently as the 16th of March (1883). It caused such a thick deposit as to lead ignorant people to take it for brimstone. These facts are sufficient to show that the influence of pollen may be experienced under circumstances where it would not generally be looked for.

---

[1] "A Practical Treatise on Diseases of the Lungs." London, 1871, 4th ed. p. 228.

[2] "On Hay Fever." London, 1866, 4th. ed.

[3] "Journal of Researches, &c." London, 1845, 2nd ed. p. 5.

[4] "The Effects of Cross and Self-Fertilization in the Vegetable Kingdom." London, 1876, p. 405.

[5] "Philadelphia Med. News," April 7th, 1883.

Whilst asserting that pollen is the universal cause of the peculiar form of catarrh known as hay fever, I do not mean to deny that other irritating particles might produce a similar complaint if persistently brought in contact with the mucous membrane. Thus, it is well known that powdered ipecacuanha will in some persons cause a peculiar form of asthma closely resembling hay asthma, and with many people the fumes of burning sulphur have the same effect. I have frequently observed slight attacks resembling hay fever produced by the insufflation into the larynx of powdered lycopodium, and, indeed, I have for this reason been compelled to give up the use of this drug as a diluent for medicinal powders. Some people experience symptoms somewhat analogous to those of hay fever from smelling certain fruits, whilst others are troubled in the same way by the presence of cats, rabbits, and guinea-pigs, and Bastian[1] suffered from an affection closely resembling hay fever in dissecting the *ascaris megalocephala*, a parasite which infests the horse. If the specific exciting influence is kept in operation on a person subject to an idiosyncrasy of this kind, a complaint almost precisely similar to hay fever is produced; but as a rule, the conditions leading to its manifestation are exactly known by the patient, and can therefore be avoided. The etiological peculiarity of hay fever consists partly in the fact that the idiosyncrasy as regards pollen is more common than other individual susceptibilities, but chiefly in the circumstance that at certain seasons pollen exercises its influence over wide areas, and can be excluded only with great difficulty.

In a recently published article, Daly,[2] of Pittsburg, has endeavoured to show that in a large proportion of cases there is an intimate relation between hay asthma and chronic nasal catarrh, and that except when disease of the nasal mucous membrane exists the alleged exciting cause of summer catarrh is inoperative. He reports two cases of thickening of the turbinated bodies, and one of polypus, in which, after the cure of the local condition, the patients lost their susceptibility to hay fever. These persons had suffered from summer catarrh for twenty-one, fifteen, and six years respectively. Roe[3] and Hack[4] have since enunciated similar views to those propounded by Daly. It is not at all unlikely that an unhealthy state of the mucous membrane of the nasal fossæ may predispose to hay fever, but I may remark that I have repeatedly examined the interior of the nose in cases of hay fever without finding anything more than general congestion.

---

[1] "Philosophical Transactions." 1866, vol. cvi.

[2] "Archives of Laryngology." 1882, vol. iii. No. 2.

[3] Loc cit.

[4] Loc. cit.

Symptoms.—The disease shows itself under two well-marked types, the catarrhal and the asthmatic. In the former the onset is very sudden, the patient becoming conscious of an itching, smarting sensation in the nose and eyes, and sometimes in the fauces and roof of the mouth. Not unfrequently the attack commences with a feeling of extreme irritation at the inner canthi. Paroxysms of sneezing, often of extreme violence, quickly ensue, followed by an abundant thin discharge from the nose. The mucous membrane of the nasal fossæ swells so as to block up the passages and make respiration through them impossible. At the same time there is profuse lachrymation with much pricking and stinging of the conjunctival surfaces and sometimes photophobia. There is often a certain amount of chemosis, and occasionally the eyelids become puffed so as almost to close the eyes. The discharge from both nose and eyes gradually grows thicker, and sometimes becomes even semi-purulent in character. There may be severe neuralgic pain in the eyeballs and over the back of the head. Now and then there is some degree of pyrexia, but this is by no means the rule. The disorder often varies considerably in intensity, even in the same person within short intervals of time, so as almost to give an intermittent character to the complaint. This is due to the varying quantity of pollen present in the atmosphere, the severity of the disease being, as a rule, in direct proportion to the abundance of the *materies morbi.* An attack lasts from a few hours to several days, or even longer, finally ceasing almost as suddenly as it set in, and leaving little or no trace of its presence either in local lesion or systemic disturbance. In some patients hay fever is accompanied by nettle rash.

The asthmatic form of the complaint may be superadded to the disorder just described, or may constitute the entire affection. It generally comes on in the day-time, and the paroxysm may pass off in a few hours, the patient first expectorating a little ropy mucus and later an abundant frothy secretion, or there may be only a slight remission, the dyspnœa continuing as long as the sufferer is exposed to the influence of pollen. The attacks seldom produce any emphysema, and the patient sooner or later entirely recovers

Diagnosis.—From the resemblance of hay fever to common catarrh on the one hand, and to spasmodic asthma on the other, mistakes in diagnosis were formerly very common: but the disease is now so well known that errors are not likely to occur. The first attack might perhaps be confounded with ordinary coryza; but the suddenness of the onset, the characteristic œdematous puffiness of the eyelids, together with the absence of constitutional symptoms, will speedily lead to a truer diagnosis. People who are prone to catarrh are very apt to catch cold in the changeable weather of the spring and early summer of this country, and these cases are sometimes mistaken for hay fever; but the readiness with which they yield to anti-catarrhal treatment at once shows their real nature.

The asthmatic form of hay fever may, in some instances, be less easy to recognize; but the history of the case will generally guide the practitioner to a correct opinion. The fact that hay fever often comes on in the day-time, out of doors, and in the summer, whilst paroxysms of true asthma most frequently occur in the evening or night, indoors, and in one of the other seasons of the year, may help to differentiate the two complaints.

Prognosis.—This is in all cases favourable as regards the termination of each attack; *cessante causá, cessat effectus.* When the season of flowering grass is past the complaint will certainly depart; but it will almost as surely reappear whenever the patient is again exposed to the action of pollen.

Pathology.—Hay fever leaves no permanent structural lesion behind it. Blackley thinks that pollen has a peculiar and specific effect in causing dilatation of the capillaries and exudation of serum from them; but it appears to me highly doubtful whether this is anything more than the reaction which follows the application of an irritant.

Treatment.—In no disease is the old adage, that "prevention is better than cure," more truly applicable than in the case of hay fever. If the poison be continually introduced into the system, the antidote, if one exists, can have but little chance of effecting a cure. The first measure, therefore, must be to remove the patient from a district in which there is much flowering grass. A sea-voyage is probably the most perfectly satisfactory step that can be taken. Patients who are unable to go to sea should endeavour to reside at the seaside, where they will generally be free from their troublesome complaint, except when land-breezes blow. Dwellers in towns should avoid the country, and those who reside in the country should make a temporary stay in the centre of a large town. It often happens, however, that such a change of abode is not practicable, and, under such circumstances, if the complaint is very severe, the patient should, if possible, remain indoors during the whole of the hay season. Many persons, of course, cannot keep to the house during the month or six weeks of the hay fever period; and those who can, are apt to find such detention not only exceedingly irksome, but very injurious to the health. If, therefore, a patient is obliged to go out of doors he should plug his nostrils with cotton-wool or wadding by means of Gottstein's screw (Fig. 73, p. 282), and should defend his eyes by wearing spectacles with large frames, accurately adapted to the circumference of the orbits.[1] Protected in this way, many people predisposed to hay fever escape altogether, whilst others contract the affection in a very mild form.

As the disease most commonly occurs in persons of nervous temperament, nerve-tonics and other constitutional remedies have been used for the purpose of warding off hay fever, or controlling the violence of its attacks. Amongst these, quinine, arsenic, opium, and belladonna have been employed, but I have found valerianate of zinc, in combination with assafœtida, more valuable than any other drug. I usually give the remedy in the form of pills containing one grain of valerianate of zinc and two grains of the compound assafœtida pill. I direct my patients to begin taking these pills as the hay season approaches, and under the use of this remedy, persons who formerly suffered most severely from hay fever have in many cases ceased to be troubled with it.

When the disease is established, tincture of opium is of great benefit in controlling hay asthma, reducing the secretion, diminishing the sneezing, and at the same time bracing up the nervous system. It should be given in the manner recommended for acute catarrh (p. 290), but continued for a longer time. Belladonna has been recommended, but I have had no experience of its use in this complaint.

I trust very little to local measures in the treatment of hay fever, but when there is profuse secretion with an excessive tendency to sneeze, the inhalation of strong ammonia salts often gives great relief. I have not found injections of quinine, as recommended by Helmholtz, at all useful. Though in a few cases benefit was derived, in most instances no effect was produced, whilst some patients were actually made worse. The Vapor Benzoini of the Throat Hospital Pharmacopœia has occasionally produced a soothing effect, and I have also seen good results from insufflations into the nose of a powder consisting of one-sixteenth of a grain of morphia and one grain of bismuth. This should be applied several times a day. Ferrier's snuff (see Appendix) may be substituted for the above formula, but it should be applied by insufflation.

---

[1] Both the screw and the spectacles are sold by Messrs. Mayer and Meltzer, Great Portland Street.

In a few cases I have seen some benefit from the use of medicated bougies, such as the bismuth, and acetate of lead Buginaria of the Throat Hospital Pharmacopœia (see Appendix), but, like quinine, they occasionally aggravate the mischief they are meant to cure.

The upper lip and the margins of the nostrils should be smeared over with benzoated zinc ointment two or three times a day.

For the relief of the irritation of the eyes, frequent bathing with very cold water is sometimes useful, though Roberts[1] appears to have found more benefit from warm and slightly salt water. Sulphate of copper (gr. ij. ad ℥j.) or sulphate of zinc (gr. ij. ad ℥j.) may sometimes do good, but I have found a lotion containing two grains of acetate of lead with two drops of dilute acetic acid in an ounce of water, the most soothing application.

Asthmatic patients often derive benefit from inhaling the fumes of nitrated blotting paper (see Appendix, Vol. i. p. 576), the good effect of which is further increased by steeping the paper in a solution of stramonium, datura tatula, belladonna, or lobelia.

CHRONIC NASAL CATARRH.

Latin Eq.—Catarrhus longus.
French Eq.—Coryza chronique.
German Eq.—Chronischer Nasencatarrh.
Italian Eq.—Corizza cronica.

Definition.—*Chronic inflammation of the lining membrane of the nasal fossæ characterized by swelling of the*

---

[1] "New York Med. Gaz." Oct. 8, 1870.

mucous membrane, by increase in the natural secretion, by more or less obstruction of the nasal passages, nasal voice, and impairment or loss of smell. The affection sometimes causes a watery flux, and when neglected may give rise to great hypertrophy of the turbinated bodies.

History.—Since the issue, many years ago, of Cazenave's[1] two papers, little attention was directed to the complaint until it began to be studied by American physicians. Excellent practical articles have recently been published by Solis Cohen,[2] Beverley Robinson,[3] and Bosworth;[4] whilst Rumbold[5] has given his views on the disease at great length. In Europe the subject has been treated by Michel,[6] Tillot,[7] Löwenberg,[8] and Bresgen.[9]

Etiology.—The commonest cause of chronic catarrh is the previous occurrence of acute attacks. The most obstinate cases are generally supposed to depend on the strumous diathesis, or to occur in persons who have suffered from constitutional syphilis; but I have sometimes found the complaint very intractable when there was not the slightest evidence of any constitutional taint. The disease may commence at any period of life, but is most common in childhood, when it is occasionally caused by the presence of adenoid vegetations in the naso-pharynx. In the aged it often assumes the character of a mild flux, producing the "bead" at the end of the nose, made so familiar by caricaturists. Chronic catarrh may be induced by any of the various causes referred to in connection with acute catarrh, such as the inhalation of irritating vapours, or of solid particles suspended in the atmosphere. Snuff-takers and spirit-drinkers are generally subject to chronic catarrh of the nose, and whilst the affection is occasionally the cause, it is often the consequence of a polypus in the nasal cavity.

Symptoms.—An increased secretion of mucus is the most common symptom of chronic nasal catarrh, but the patient almost always experiences a feeling of "stuffiness" in the nose. There is often sufficient obstruction to interfere with nasal respiration, and the well-known alteration in the character of the voice, already described in dealing with acute catarrh (pp. 288, 289), is produced. The patient in such a condition is popularly said to speak "through his nose," though as a matter of fact the peculiarity is due to obstruction of the nasal passages. The affection sometimes extends to the naso-pharynx, and may even spread up the Eustachian tube, and give rise to catarrh of the middle ear and serious deafness.[1] In severe cases the tear-duct is often obstructed, and, as Bresgen[2] has pointed out, even when the complaint is slight the skin of the nose, especially near its tip, is generally red.

---

[1] "Sur le Coryza chronique." Paris, 1835; another article, 1848. This physician practised at Bordeaux, and must not be confounded with his celebrated namesake of Paris.

[2] "Diseases of the Throat and Nasal Passages." New York, 1879, 2nd ed. p. 346. et seq.

[3] "Practical Treatise on Nasal Catarrh." New York, 1880, p. 69, et seq.

[4] "Manual of Diseases of the Throat and Nose." New York, 1881, p. 179, et seq.

[5] "Hygiene and Treatment of Catarrh." St. Louis, 1880.

[6] "Krankheiten der Nasenhohle." Berlin, 1876.

[7] "Annales des Maladies de l' Oreille, etc." 1879.

[8] "Union Médicale." July 28, 1881.

[9] "Der chronische Nasen und Rachen-Katarrh." Wien und Leipzig, 1883.

Occasionally, on the other hand, the complaint consists of a constant running of watery fluid from the nose, constituting a veritable *rhinorrhœa*, the secretion being sometimes so abundant as to cause the greatest inconvenience. I have treated several cases in which the patient has been obliged to use fifteen or twenty pocket-handkerchiefs in a single day, and one in which from thirty-two to thirty-five were required daily for a fortnight. A good example of the affection is related by Morgagni,[3] in which a woman suffered from a discharge of "watery fluid" from the left nostril (after the other symptoms of an ordinary catarrh had left her) for several months. About half an ounce passed every hour, and the patient, who had been fat and florid, wasted away. On the stoppage of the rhinorrhœa she recovered weight. The same writer quotes from Bidloo an instance, apparently of traumatic origin, in which twenty-five ounces of pale fluid were discharged from the right nostril in twenty-five hours. A still more remarkable case is related by Elliotson,[4] where a lady on two different occasions suffered from profuse discharge of watery fluid from the left nostril, the first attack having lasted eighteen months, and the second twenty-three. It was estimated that during the first attack she passed one hundred and ninety-three gallons of fluid in all, whilst during the second, three quarts were discharged in a single day. On the first occasion the affection ceased suddenly without any apparent cause; on the second it stopped gradually under the internal and local use of sulphate of zinc prescribed by Sir Benjamin Brodie,[1] but as no amelioration whatever took place during the first three weeks of this treatment, Elliotson doubts whether the remedy really had any effect in controlling the disease.

---

[1] Dr. Rumbold, whose work on catarrh has already been referred to, states (Pt. ii. pp. 239, 240) that in the course of eighteen years of practice he has "had many patients, amounting to several hundred, whose mental condition has been more or less affected by this inflammation extending from the nasal passages to the membranes of the brain. . . . Uncontrollable melancholia and dissatisfaction, inability to think consecutively, to recollect the common matters of life, to add up a column of figures, to remember immediate relations' names," are some of the distressing symptoms exhibited by Dr. Rumbold's patients. Others forget even their own names, whilst one unfortunate gentleman, whose nose was no doubt in an exceptionally morbid state, "experienced the sensation, while walking, that he was sinking into the pavement up to his knees." Such complications of catarrh, however, are fortunately not met with in this country.

[2] Op. cit. p. 70.

[3] "De sedibus et causis morborum," epist. xiv. sec. 21.

[4] "Med. Times and Gaz." Sept. 19, 1857.

It will be understood from the above description of the very varying character of the secretion that the condition of the mucous membrane itself must differ greatly in individual cases. On examining the nose in ordinary cases of chronic catarrh the mucous membrane is seen to be red and succulent, and covered here and there with patches of thick, moist, yellow secretion, or with a few thin flakes of dried mucus. In rhinorrhœa, on the other hand, the lining membrane is usually pale and sodden. If the disease exists for any length of time, some of the morbid changes described in the next article may be seen. In all cases of chronic inflammation, abrasions of surface are apt to occur, and these sometimes give rise to small ulcers, causing great annoyance by exciting a sensation of tingling and heat in the nose, which often leads the patient (especially if a child) to pick off the scabs and thus increase the irritation. The ulcers most frequently form in the mucous membrane covering the cartilaginous septum just inside the nose, and in neglected cases perforation may take place, and a permanent aperture result.

Diagnosis.—If a complete examination can be made, and it can be ascertained that neither polypi, polypoid tumours, nor post-nasal adenoid growths are present, there will be no difficulty in determining the nature of the affection, which, indeed, is generally quite obvious. It is only in cases of severe rhinorrhœa that any doubt can arise, and in these it must not be forgotten that excessive discharge of a watery fluid from the nose may be caused by a polypus in the antrum,[2] or may be of reflex character and result from disease or injury of the fifth nerve,[1] from optic neuritis,[2] and probably from even more remote sources of irritation.

---

[1] Quoted by Elliotson, loc. cit.

[2] Paget: "Trans. Clin. Soc." 1879, vol. xii. p. 13, et seq.

Prognosis.—With ordinary care a favourable result may always be predicted, but there is a great tendency to recurrence in the old, the very young, and in persons of debilitated constitution. It is most important, however, to cure every case as quickly as possible, especially in young children, lest the disorder should lead to hypertrophy, or possibly to atrophy and ozæna.

Pathology.—Little is known as to the local condition in ordinary chronic catarrh of the nose, but it is likely that the usual phenomena characterizing chronic inflammation in mucous membranes are exhibited in such cases. Infiltration of the sub-epithelial connective layer, with consequent thickening and induration of the membrane and atrophy of the glandulæ owing to the pressure exercised on them by the tissues in which they are imbedded, probably constitute the sum of the morbid changes to which chronic catarrh gives rise within the nose, though the troublesome sequelæ detailed in the next article are not unlikely to occur in protracted cases.

Treatment.—Astringent washes, douches, and sprays are generally the best remedies, but it is very important to remember that the mucous membrane of the nose will not bear nearly such strong medicaments as the pharynx or larynx. Simple alkaline solutions, such as bicarbonate of soda (gr. x. ad ℥j.), often answer perfectly well, but the remedy which I have found most effectual is the "compound alkaline wash" (see Appendix, Nasal Washes). Several of the collunaria contained in the Throat Hospital Pharmacopœia are sometimes of service, especially the coll. acidi tannici, and the coll. aluminis. If washes and douches cause pain, sprays may be employed, and they are likely to be most useful when the secretion is thin and abundant. In such cases I have known a spray of tannic acid (gr. iij. ad ℥j.), or alum (gr. iv. ad ℥j.), rapidly effect a cure in cases that have been going on for months and even years. If solutions do not succeed, some of the astringent or sedative powders, the formulæ for which will be found in the Appendix, may be blown into the nose once or twice daily by the patient with Bryant's auto-insufflator, or the same class of remedies may be employed as snuff. Porter,[1] of St. Louis, has found the frequent use of a snuff composed of camphor, tannic and salicylic acid very advantageous. In long-standing cases medicated bougies, as first recommended by Catti,[2] are often of great service, the Buginarium bismuthi, and the B. plumbi acetatis (Throat Hospital Phar.) being especially efficacious. Should there be much swelling of the mucous membrane a gum-elastic bougie (p. 254) should be passed into the nose every day, and at first allowed to remain *in situ* for a few minutes. This period may be gradually extended to half an hour, a larger instrument being used as the passage widens.

---

[1] Althaus: "Brit. Med. Journ." 1868, vol. ii. p. 647, et seq.

[2] Nettleship: "Ophthalmic Review." Jan. 1883, vol. ii. No. 15, p. 1, et seq. Priestley Smith: Ibid. p. 4, et seq.

In some cases, however, every kind of local treatment seems only to irritate, whilst a cure can be quickly effected by keeping the mucous membrane at rest. With this view it is very important that the patient should be directed not to *blow* his nose, the forcible removal of the mucus causing an increased flow of blood to the part, and consequently a more copious secretion. If the patient will submit to the slight inconvenience occasioned by the collection of mucus, and merely *wipe* the nose from time to time, the secretion will diminish, and will soon cease to be troublesome. Sneezing should, if possible, be prevented in the manner already recommended (p. 291). Should hypertrophy of the mucous membrane take place, the case will probably require to be treated by some of the various measures described in the next article.

In obstinate cases, and especially when old persons are the subjects of the complaint, constitutional treatment of an analeptic and tonic character should be carried out, and above all things, such patients should be enjoined to seek, if possible, a warm and dry climate. Where the complaint is of a secondary character, the original malady must be removed before a cure can be looked for.

HYPERTROPHY OF THE MUCOUS MEMBRANE OF THE NOSE.

When chronic catarrh of the nose has existed for some years, and, indeed, in children of scrofulous type, when it has troubled the patient for only a few months, great thickening of the mucous membrane sometimes takes place, This hypertrophy may involve either the front or back portion of the nasal passages. The colour of the swollen mucous membrane is generally bright red in front, but of a duller red or purple tint in the posterior portions of the nose. The anterior extremity and the whole lower border of the inferior turbinated body is perhaps the most common site of the hypertrophy, which in the latter situation is occasionally so considerable as completely to block up the inferior meatus. Less frequently the middle turbinated bodies are the seat of hypertrophy. When the thickening affects the posterior part of the lower turbinated bodies, instead of producing a more or less uniform swelling of the tissues, it more often leads to the development of numerous dark red or purple polypoid vegetations, giving the turbinated body a somewhat mulberry-like appearance (Fig. 75). Sometimes the growths are pale, and appear to hang down from the choanæ towards the uvula (Fig. 76). These excrescences

---

[1] "St. Louis Med. and Surg. Journ." Dec. 1875.

[2] "Zur Therap. d. Nasenkrankheiten."—"Wien. med. Zeitschr." 1876.

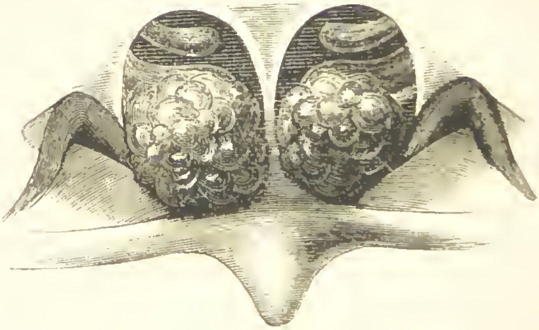

FIG. 75.—HYPERTROPHY OF BOTH TURBINATED BODIES. (SEEN FROM BEHIND.)

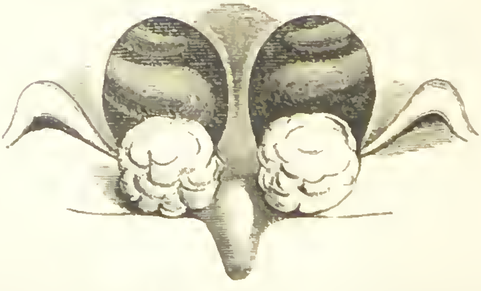

FIG. 76.—SHOWING THE PALE VARIETY OF HYPERTROPHIED TISSUE. (SEEN FROM BEHIND.)

bleed readily, though only slightly, when touched. Whether the hypertrophy involves the anterior or the posterior portion of the turbinated bodies, if at all considerable, the swelling is almost always bilateral, and generally symmetrical. Occasionally the septum is greatly thickened, the hypertrophy usually occurring at the lower and back part.

The *symptoms* are the same as those of ordinary chronic catarrh, but intensified, the patient being often quite unable to blow his nose, and being obliged to breathe entirely through the mouth. The voice is persistently nasal, and the patient, if a child, always keeps the mouth open, presenting the well-known stupid appearance which has already been described in connection with the subject of enlarged tonsils (Vol. i. p. 62). It has recently been noticed by several physicians that obstruction of the nasal passages is apt to give rise to very troublesome reflex phenomena, such as asthma, cough, and even epilepsy, complications which will be considered in dealing with polypus of the nose (see p. 360, et seq.). These phenomena, however, are not nearly so frequent in cases of simple hypertrophy as in polypus, the probable reason being, as suggested by Hack,[1] that the morbid alteration of structure destroys the cavernous tissue, diminishes sensibility, and thereby lessens reflex excitability.

The *diagnosis* is easy, for a careful examination with the speculum and rhinoscope will usually reveal the nature of the case. Those, however, who are not practised in the examination of the interior of the nose sometimes mistake a thickened condition of the mucous membrane covering the lower spongy bone for a polypus. It is only necessary, however, to bear in mind the fact that hypertrophy is nearly always bilateral, and in most cases symmetrical, a circumstance which generally serves to differentiate the affection from polypus. Moreover, catarrhal thickening chiefly affects the *lower* turbinated bodies, whilst true polypi, as a rule, spring from the mucous membrane covering the *middle* and *upper* bones or the corresponding meatuses. Cases not unfrequently occur, however, in which polypi and hypertrophy coexist, and occasionally one of these conditions conceals the other. Gottstein[2] has pointed out that it is not always possible at first to distinguish between the swelling produced by chronic perichondritis and that due to simple hypertrophy. In a very instructive case related by that observer, the appearance was entirely that of hypertrophic catarrh; but after an absence of two months the patient, who meanwhile had remarked no change in his symptoms, returned with extensive destruction of the septum, due to the perichondritis which had doubtless existed all along.

---

[1] "Neue Beiträge zur Rhinochirurgie." Wien, 1883.

[2] "Berlin. klin. Wochenschrift." 1881, No. 4.

The *pathological changes* which sometimes result from chronic nasal catarrh are no doubt largely due to the peculiarly vascular and cavernous structure of the turbinated bodies (see Anatomy, p. 236). The hypertrophy occasionally produces an appearance somewhat resembling in form the *flocculus* of the cerebellum, but of a bright pink or deep red colour. This is well shown in the annexed cut (Fig. 77), copied from a specimen in the Museum of the Royal College of Surgeons. The morbid process has been carefully studied and well described by Bosworth[1] and Seiler.[2] From the investigations of these observers, it would seem that the

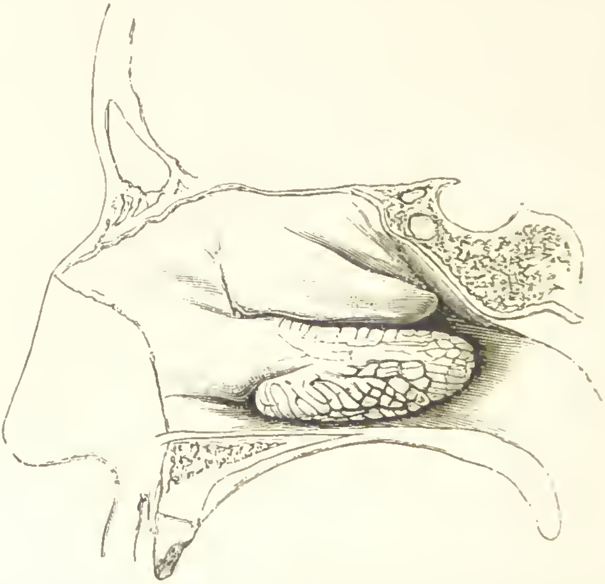

FIG. 77.—HYPERTROPHY OF THE POSTERIOR THREE-FOURTHS OF THE LOWER TURBINATED BODY. FROM SPECIMEN NO. 2201C IN THE ROYAL COLLEGE OF SURGEONS' MUSEUM.

(The outline of the nose has been added by the artist.)

---

[1] "Trans. Intern. Med. Congress." London, 1881, vol. iii. p. 327, et seq.; and "The (New York) Medical Record," June 10, 1882.

[2] Philadelphia "Med. Times," Jan. 14, 1882. See also the report of a case by Thierfelder ("Atlas der path. Histol." Lief. 1) referred to by Seiler.

changes which take place are similar to those commonly observed in chronic inflammation of mucous membranes. Thus the epithelial cells are increased in number, and though showing no marked tendency to desquamation, are seen here and there to be undergoing fatty degeneration; the basement membrane is thickened, the mucosa densely infiltrated with small cells; the glands and their ducts are filled with proliferating epithelium, the blood-vessels increased, both in size and in number, and the trabeculæ and sinuses greatly enlarged.

There is no doubt a close connection between thickening of the nasal membrane and genuine polypus. The two conditions are frequently found associated, and a good illustration of this is afforded by a specimen in the Museum of the College of Surgeons, a woodcut of which will be found further on (see Fig. 79, p. 365). Some cases classified as hypertrophy of the nasal mucous membrane are also probably of papillomatous nature (see "Papilloma of the Nose").

The *prognosis* is favourable, for almost every case can be cured by suitable treatment.

The *treatment* frequently needs to be of a vigorous character, but at an early stage the mildest measures are sometimes sufficient, the daily use of gum-elastic bougies often effecting a cure. The smallest size of instrument should, as a rule, be used at first, and at the beginning of the treatment the bougie should be left in the nose for no longer than five minutes at a time; after a few days, however, it may remain *in situ* from ten minutes to a quarter of an hour, and at the end of a week it can be easily tolerated for half an hour. Larger bougies should afterwards be employed, but force must be carefully avoided. Mild alkaline sprays or hand-washes are often of great service if the treatment is perseveringly carried out. Sneezing must be checked by smelling strong ammonia or acetic ether.

Should this plan not succeed more active steps must be taken; but a word of caution is perhaps necessary in connection with this point. For, though the introduction of the electric cautery and the wire écraseur permits some relaxation of the rule under which surgeons were taught "to cut through everything soft, to saw through everything hard, and to tie everything that bleeds," the spirit of this simple instruction has, I fear, in recent years, sometimes influenced the young practitioner, and the nasal passages have occasionally been "cleared" with a zeal and energy worthy of the industrious backwoodsman. In several cases that have come under my own care, in which severe measures had previously been urgently advised by others, I have succeeded in effecting a cure by the simple removal of all causes of irritation and the persevering use of gentle dilatation. I would also warn some of my younger *confrères* that as the appearance of the interior of the nose varies immensely in healthy persons, it is unnecessary, where no inconvenience is felt, to restore geometrical symmetry to the turbinated bodies, or to invest the lining membrane of the nose with artistic merit. But whilst deprecating unnecessary aggression in this tender region, I do not deny that there are many cases which can only be cured by active treatment.

Should the hypertrophy resist the measures already recommended, the redundant tissue must be destroyed or removed. Destruction with electric cautery will be found the most simple and efficacious method. If the thickening is in the anterior part of the nose, the nostrils should be well dilated with a speculum, and the exuberant tissue carefully destroyed with the porcelain knob electrode, or removed with the hot loop (see Vol. i. p. 508, Fig. 101, *c* and *d*), or a number of slight lines may be burnt with the spatula-like points (Vol. i. Fig. 101, *a*). If the thickening affects the central portions of the turbinated bodies Löwenberg's electrode (p. 273) answers well, and when the posterior part of the middle turbinated bodies is involved, Lincoln's instrument (Fig. 61, p. 273) will be found very serviceable. In applying electro-cautery, as already remarked, I endeavour to avoid employing a protective shield, the loss of space and contracted field of vision involved in the use of such an instrument often more than neutralizing any advantage which it may possess. Sometimes, however, when the swelling is very great, a shield is required, and in these cases I find Shurly's instrument (see p. 255) the best. Instead of electric cautery Paquelin's thermo-cautery, as modified by Goodwillie,[1] can be tried: but as this instrument has to be introduced red hot, it is more likely to cause accidental injury than electric cautery, and it can seldom be used except when the patient is under chloroform. Those who have neither this instrument nor any convenient electric apparatus at hand, can destroy the redundant tissue by means of London paste (Thr. Hosp. Ph.), nitrate of silver, or glacial acetic acid. The two first-named caustics can be readily applied with the pharyngeal spatula

---

[1] Beverley Robinson: "Practical Treatise on Nasal Catarrh." New York, 1880, p. 111.

(Vol. i. p. 9), whilst nitrate of silver can be brought into contact with the hypertrophied tissue either with Schrötter's (Fig. 40, p. 257) or Andrew Smith's instrument (Fig. 41, p. 258), or with Allen's wires (p. 258). Bosworth[1] has found glacial acetic acid of greater value than any other caustic, and Sajous[2] has also strongly recommended this remedy.

Instead of destroying the hypertrophied tissue, however, it may be removed by a cutting operation. For this purpose either a snare or sharp forceps may be employed. Jarvis's[3] écraseur (p. 271) is an excellent instrument, whilst my own (p. 272) will be found very convenient. When the anterior part of one of the turbinated bodies is enlarged it should first be transfixed with a needle mounted in a light handle, the loop of the écraseur being then passed over the needle, and gradually drawn round the hypertrophied membrane. If the posterior extremity of the turbinated body be the part affected, such a bend should be given to the loop before it is pushed through the nose that it will pass over the mass in the naso-pharynx. Two or three turns of Jarvis's screw, or a few touches of the lever of my instrument, will suffice to secure the growth, which, if hæmorrhage is anticipated, should be cut through very slowly, the operation being interrupted from time to time, and not completed for half an hour or even an hour. In these cases it will be found much more easy to remove the swollen tissue with the écraseur passed through the nose than to destroy it through the naso-pharynx. Beverley Robinson[4] has successfully removed hypertrophied tissue from the turbinated bodies by means of his strongly-toothed forceps (p. 267), but this treatment appears to be much more severe than either the electric cautery or the wire écraseur.

---

[1] "Diseases of the Throat and Nose," New York, 1881; and "New York Medical Record," June 10, 1882.

[2] "Med. and Surg. Reporter." Dec. 31, 1881.

[3] "New York Medical Record." 1881.

[4] Op. cit. p. 114.

DRY[1] CATARRH OFTEN LEADING TO OZÆNA.[2]

Latin Eq.—Catarrhus siccus abiens sæpe in ozænam.
French Eq.—Coryza sec conduisant souvent à l'ozène.
German Eq.—Trockener Katarrh oft in Ozæna übergehend.
Italian Eq.—Catarro secco producendo spesso l'ozena.

Definition.—*Chronic inflammation of the lining membrane of the nose, in which a thin secretion, instead of flowing away, dries on the surface, giving rise to adherent brown or green flakes or crusty masses of dried mucus, which are apt to undergo decomposition and cause a disgusting and characteristic stench known under the name of ozæna. There is often atrophy of the turbinated bodies and of the subjacent bony structures, whilst the nasal passages and meatuses are proportionately increased in capacity.*

History.—The relation of dry catarrh to ozæna has only been recognized in quite modern times, but the term *ozæna* is one of the oldest in medicine. As used by the Greek and Latin technical writers, it signified not simply a stench, but, more concretely, a foul-smelling ulcer in the interior of the nose. Pliny[1] mentions the treatment of *ozænæ* (ulcers) of the nose, and Celsus[2] quotes the Greek surgeons as applying the term to fetid sores covered with crusts. The etymological meaning of the word, however, was soon forgotten, and a century and a half after the time of Celsus we find Galen[3] speaking of two kinds of ozæna—one being simply an ulcer difficult to cure, and another where the ulcer is accompanied by a disagreeable odour. Paul of Ægina[4] defines ozæna as a "carious and putrid ulcer, produced by saturation (of the nares) with acrid humours." Ætius[5] refers to ozæna as being of the nature of an ulcer, and advises treatment by remedies applied by insufflation through a reed, or by means of medicated tents inserted in the nostrils. Alexander

[1] "Hist. Nat." 25, 13, 102.
[2] "De Medicinâ," lib. vi. cap. 8.
[3] "De compos. pharmacorum sec locos," lib. iii. c. 3.
[4] "Opera," lib. iii. c. 24.
[5] "Tetrabiblos," ii. sermo. ii. cap. 90.

---

[1] Notwithstanding the recent strictures of Virchow ("Address delivered before the Berlin Medical Society, January 24, 1883," "Med. Press and Circ." April 11, 1883, p. 312), principally based on etymological considerations, to the term "dry catarrh," its convenience is so great that it cannot well be dispensed with. Dry catarrh means a catarrh in which the secretion is prevented from "flowing away" through its rapidly drying property. In other words the term avoids the use of a long explanatory paraphrase.

[2] Ὄζη, a stench. Forcellini (sub voce) states that the term in its medical sense is derived from *ozæna*, a fish, "ex polyporum genere, caput habens gravissimi odoris;" but it seems more probable that the fish and the disease take their name from the same word.

Trallianus,[1] in the sixth century, mentions the disease, merely, however, repeating the words of Galen. In the twelfth century, Actuarius[2] gives a clear description of the condition as arising from decomposed secretions, without mentioning ulceration as a necessary feature of the complaint. Ambroise Paré[3] contents himself with transcribing the words of Galen, merely adding a suggestion for a remedy of which *urina asini* appears to have been the chief ingredient. In the beginning of the seventeenth century, Johannes Crato[4] anticipated in a remarkable manner the most modern doctrine as regards the nature of ozæna. His words are: "Imo in catarrhosis *pituitam putrescere*, et putridum quiddam eos expirare indicio sunt coryzæ halitu etiam contagiosæ." Fabricius ab Acquapendente[5] seems to have been familiar with the affection, which he looked upon as an ulceration of the interior of the nose, often connected with syphilis, but not at all necessarily dependent thereon. Sir Thomas Mayern[6] mentions several remedies for the disease which he also considered as being most frequently due to venereal disorder, but in some cases proceeding "ab humoribus acribus et salsis." At the close of the seventeenth century, Vieussens[7] taught that *fœtor narium* —*i.e.*, ozæna in its modern sense—arises from the fermentative putrefaction which the mucous secretion is apt to undergo if it be retained too long within the nose or the adjoining sinuses. Some years later Reininger[8] maintained that the decomposition of mucus within the ethmoidal, sphenoidal, and frontal sinuses, and the antrum of Highmore, produced almost incurable ozæna. Günz[9] published some valuable observations, chiefly of cases where the odour was due to disease of the sinuses opening into the nose. This subject, like everything else in connection with the nose, is treated of with his usual erudition by Cloquet in the work[10] already frequently referred to. Cazenave,[11] of Bordeaux, studied the complaint from a scientific point of view, as far as could be done with the imperfect means of diagnosis at his command. Trousseau,[12] whilst refusing to commit himself to any theory as to the origin of ozæna, described its clinical features with remarkable clearness, and his instructions for treatment were marked by his usual sound sense. A great step in advance was made by Otto Weber,[13] who pointed out that ozæna is merely a symptom, and that it would be better either to lay this term altogether aside, as only serving to conceal an incomplete diagnosis, or to retain it for those cases in which there is no trace of ulceration. In recent years, improved methods and appliances for the examination of the nose have led to a more active interest in its diseases, and a number of valuable monographs and papers have appeared on

[1] "De arte medicâ," lib. iii. cap. viii.

[2] "De methodo medendi," lib. ii. c. viii.

[3] "Chirurgie," liv. ii. chap. xv.

[4] "Epist. Philos. Medic." Hanoviæ, 1610, epist. cvi. p. 188.

[5] "Opera chirurgica." Lugd. Batavorum, 1723, p. 144, et seq.

[6] "Praxeos Mayernianæ Syntagma." Londini, 1690, vol. i. cap. xvi. p. 89; also vol. ii. p. 261, et seq.

[7] "De cerebro," cap. xvi.; in Leclerc and Manget's "Bibliotheca Anatomica." Genevæ, 1699, t. ii. p. 159.

[8] "Dissert. inaugur. de cavitatibus ossium capitis." Altorf, 1722, § xxxix. p. 31.

[9] "Obs. ad ozænam maxillarum." Lipsiæ, 1753, p. viii.

[10] "Osphrésiologie." Paris, 1821.

[11] "De l'Ozene non-vénérienne." Paris, 1851.

[12] "Clinical Medicine." Syd. Soc. Transl. 1870, vol. iii. p. 59, et seq.

[13] "Von Pitha u. Billroth; Chirurgie." Bd. iii. i. Abtheil. 2 Heft. Erlangen, 1866, p. 187.

the subject of ozæna. Of these I need only mention the contributions of Schrötter,[1] Zaufal,[2] Tillot,[3] Michel,[4] B. Fränkel,[5] Rouge,[6] Gottstein,[7] Cozzolino,[8] E. Fränkel,[9] Beverley Robinson,[10] Stoerk,[11] Franks,[12] Schäffer,[13] Martin,[14] Krause,[15] and Massei.[16] The views of several of these authors will be referred to in detail in the body of the article, but I think it desirable to remark here that the theory of Crato and Vieussens, and the more precise statements of Otto Weber, attracted little or no notice ; and it was not till Fränkel, of Berlin, insisted on the view that the term ozæna, if retained at all, should be confined to cases of dry catarrh, in which the decomposition of the retained secretions gives rise to an offensive smell, that a new era was established. This mode of regarding ozæna has since been followed by Beverley Robinson and Gottstein, both of whom have also made valuable suggestions as to the treatment of the complaint.

Etiology.—Dry catarrh is pretty common up to the period of middle life, but it rarely gives rise to ozæna in the case of adults ; indeed, in upwards of twenty years' experience I can only recall five cases in which ozæna *commenced* after thirty. One of the patients was a lady fifty-three years old, and another a man aged fifty-seven. The other three patients were between thirty and forty. On the other hand, in the case of children and young persons, especially at the age of puberty, dry catarrh so rapidly passes into ozæna that the parched condition of the mucous membrane is often not observed till the fœtor calls attention to it.

Ozæna is generally thought to be a complaint of *constitutional* origin, and those who use more precise language call it either *strumous* or *syphilitic*. Schäffer, who employs the term ozæna in a somewhat comprehensive manner, has pointed out that the countless acinous glands of the Schneiderian membrane, which are so abundantly supplied with blood through the rich cavernous structure of the spongy bodies, afford a peculiarly favourable ground for the manifestation of a dyscrasia, and he considers the complaint as always due to struma or syphilis, hereditary or acquired. He states that in 119 cases[1] he found ninety-nine of strumous and twenty of syphilitic origin. In two cases the complaint was distinctly due to hereditary syphilis. In one of them the patient died at the age of four months, presenting pemphigus on the soles of the feet, and ulcers at the margins of the nose together with a fetid discharge. In a second case, the symptoms commenced when the child was between five and six weeks old, and were relieved by mercurial treatment and carefully applied local remedies, which had been used without success in the other instance. Schrötter and Stoerk employ the word ozæna in its ancient vague sense, and their recorded experience must therefore be received subject to certain qualifications. Of seventy-seven cases reported by Schrötter, syphilis was the supposed cause in thirty-four, and scrofula in ten; whilst in the remaining cases the etiology could not be determined, except in two, which were of traumatic origin. Stoerk thinks that ozæna is always syphilitic, but that when it develops some time after birth, it is often difficult to prove its hereditary origin, and that under these circumstances, physicians fall back on the theory of scrofula. Of twelve cases examined by Gottstein, there were only two in which it appeared probable that there was any scrofulous taint, whilst in none was there the slightest trace of syphilis.

---

[1] "Jahresbericht der Klinik für Laryngoscopie." Wien. 1871 ; Ibid. 1873-75.
[2] "Aerzt. Correspondenzblatt." 1874, No. 33 ; Ibid. 1877. No. 24.
[3] "Annales des Maladies de l'Oreille, &c." 1875, t. i. p. 112, et seq.
[4] "Krankheiten der Nasenhöhle." Berlin, 1876.
[5] "Ziemssen's Cyclopædia." 1876, vol. iv. p. 136, et seq.
[6] "Compte-rendus et Mém. du Congrés des Sci. Médicales de Genève." 1877.
[7] "Breslau. Aerztliche Zeitschrift." Sept. 27, 1879.
[8] "Ozena, e pseudo-ozeni," Napoli, 1879. See also "Ozena e sue forme cliniche." Napoli, 1881, by the same author.
[9] "Virchow's Archiv." Bd. lxxv. 1 Heft, 1879.
[10] "Nasal Catarrh." New York, 1880, p. 74, et seq.
[11] "Laryngoscopie und Rhinoscopie." Wien, 1880.
[12] "Dublin Journ. of Med. Science." June, 1881.
[13] "Monatsschrift für Ohrenheilkunde." 1881, No. 4.
[14] "De l'Ozène." Thèse de Paris, 1881.
[15] "Virchow's Archiv." 1881 ; and "Trans. Intern. Med. Congress." London. 1881, vol. iii.
[16] "Giornale Internaz. delle Scienze Mediche." Anno iv. Napoli, 1882.

I do not myself consider that the disease is constitutional in the true sense of the word. Though scrofula probably produces a certain disposition to catarrh, and renders the affection more intractable when it does occur, it cannot, in my opinion, be said to cause ozæna. In adults dry catarrh shows no special disposition to affect the strumous.

I have met with only three cases in which there was any evidence of hereditary syphilis, and I only know of three in which ozæna, *without ulceration*, has followed acquired syphilis. As, however, the disease frequently arises in persons otherwise apparently healthy, it is obvious that it may occur also in those who have had syphilis. Ozæna often affects several children of the same family, but it is not contagious. I have had several negative proofs of this statement, especially in the case of nurses suffering from ozæna who have lived in the same family for years without the children under their charge becoming affected.

---

[1] Schäffer actually reports 123 cases, but as in four of these there was "independent disease of bone," they do not come within my definition of ozæna. In Schäffer's cases the female sex was affected nearly half as frequently again as the male.

The immediately exciting cause of dry catarrh is sometimes, no doubt, the entrance of irritating particles from the surrounding atmosphere. Any condition of the nasal orifices, such as unusual size, patency, forward direction, or absence of vibrissæ, which favours the entrance of irritating particles, predisposes to dry catarrh. On the other hand, anything which prevents the expulsion of morbid secretions from the nose tends to produce the disease; especially any peculiarity of shape in the nasal chambers which hinders the free blast of air through them. Thus bony or cartilaginous outgrowths,[1] or a deviated septum, may mechanically interfere with efficient blowing of the nose. A hole in the septum, by lessening the blast of air through each passage, also favours the retention of mucus. It will be readily understood that there must be a certain relation of size between the nasal passages and their external orifices, and that if the interior of the nose is too capacious, the blast of air may not be sufficient to clear all the parts of it. A relatively small size of the turbinated bodies may be the special disturbing influence, and Zaufal considers that ozæna is actually due to insufficient size of the spongy *bones*. His views will be again referred to in dealing with the pathology of this disease.

The precise conditions which cause the secretion to dry and become adherent to the mucous membrane are unknown; but the process is probably due to some chemical change in the liquid itself. It has been shown by Ranvier[2] that in acute coryza the ciliated epithelial cells are shed very abundantly, and it is possible, as suggested by Solis Cohen,[3] that the deficiency of the ciliary element in the nasal passages thus brought about may lead to the stagnation of the secretion upon the membrane, and consequently to the formation of dry crusts upon its surface. Fränkel[4] considers that the drying of the secretion is due to its richness in cells and comparative deficiency in water, and that the desiccation is further promoted by the patient failing to clear his nose sufficiently. He suggests, moreover, that in these cases there may be diminished reflex irritability, and possibly impairment of the activity of the cilia.

---

[1] Those hard tumours which give rise to *ulceration* introduce an entirely new element into the subject, and take the case out of the category of true ozæna. Soft growths, such as polypi, generally cause an increase of secretion, which, as the irritation is constant, does not become dry.

[2] "Lancet," 1874, vol. i, p. 687.

[3] "Med. News and Library," October, 1879.

[4] "Ziemssen's Cyclopædia," vol. iv, p. 138.

How it is that in some cases the retained secretions give rise to ozæna and not in others has not yet been determined. It may be that in some instances the mucus, though dry, does not remain long enough *in situ* to decompose, or the stench may, as first suggested by Vieussens, and subsequently by Fränkel, depend on some fermentative change which occurs in certain cases and not in others. In his more recent contribution to this subject, Fränkel appears to have given up this idea, and attributes the smell entirely to decomposition. I am still, however, inclined to accept his earlier explanation, for the smell seems to me to be produced too quickly to be the result of simple putrefaction. Thus, if a person suffering from ozæna has the nares thoroughly cleansed by a detergent spray the stench often only ceases for a few hours, returning within so short a period that though fermentation might have occurred, there would not have been time for true decomposition. Franks and Krause are of opinion that the smell is due to a fatty degeneration of the mucous cells, the fatty material subsequently becoming acid (see Pathology).

It has been thought by some that the peculiar smell is not developed unless there be real atrophy of the minute glands of the submucous tissues lining the nasal cavities. That atrophy commonly exists cannot be denied, but it is not a universal law; at least I may say that I have seen several cases of ozæna in which no atrophy could be detected. Gottstein,[1] who has generally found atrophy, has also reported one case in which ozæna occurred with hypertrophy; but it must be borne in mind that limited atrophy might easily have coexisted in some situation not accessible to view, both in this case and in those observed by myself.

Michel, arriving independently at the same opinion as Reininger, contends that the complaint is due to chronic suppurative inflammation of the sphenoidal and ethmoidal cells, and that the discharge from these cavities reaching the mucous membrane of the nose forms the characteristic crusts. Though in some rare cases this may occur, it is no doubt very uncommon, and has not been found to exist in the postmortem examinations which have been made by Hartmann,[2]

---

[1] "Breslau. aerzt. Zeitschrift," September, 1879.

[2] "Deutsche med. Wochenschrift." 1878, No. 13.

Krause,[1] and Gottstein (see Pathology). Massei believes that the peculiar odour depends on some specific transformation of the products of secretion, and that this alteration, probably due to some chemical change in the mucin, only takes place at the moment that the mucus passes through the epithelium. This view is, to say the least of it, somewhat speculative.

Whilst it has appeared desirable to refer to the theories of some of the recent workers in rhinology, much difficulty still surrounds the subject, owing to the fact that the term ozæna continues to be applied to totally different affections. Diseased bone, fetid ulcers, decomposed secretion, all give rise to a stinking odour, but there can be little advantage in bringing together such a variety of affections merely because they have one symptom in common. Moreover, and particularly as showing the inconvenience of thus classifying these conditions together, it may be mentioned that the stench in each of these cases is quite different. The smell of diseased bone in the nose is the same as that generated by dead bone elsewhere, but in the former situation it appears somewhat stronger, because its source is generally nearer to the bystander, and also because it is constantly diffused by expiration; but it is difficult to discover any advantage in describing the odour of dead bone in the nose by the name of ozæna. I entirely agree with Fränkel,[2] therefore, that if the term be retained, its application should be limited to those cases in which, in the absence of ulceration and diseased bone, the odour depends on changes in the retained secretions.

Symptoms.—The subjective symptoms of *dry catarrh* vary according to the site and intensity of the disorder. When the affection is limited to the anterior portion of the nasal channels, as a rule it causes but little inconvenience, the patient merely feeling a slight itching sensation, and a desire to blow the nose. In bad cases, however, the irritation is so great that the patient cannot restrain himself from scratching and picking the mucous membrane, the annoyance being chiefly felt over the septum. Under these circumstances the patient will often pick the nose to such an extent as to produce ulcers, and several cases have come under my notice in which perforation of the septum has been produced in this way.

[1] "Trans. Intern. Med. Congress." London, 1881, vol. iii. p. 311, et seq.

[2] "Ziemssen's Cyclopædia," vol. iv. p. 138.

On examining the nose from the front, the observer is generally struck by the extreme roominess of its interior, and by the small size of the turbinated bodies. Indeed, in old cases the nasal canal is so large that on simply expanding the alæ with a speculum, not only the posterior wall of the pharynx, but even the orifice of the Eustachian tube, may be visible. Crusts of yellowish-grey or brown mucus may be noticed adhering to the septum and turbinated bodies. On cleansing the nose with a detergent spray, the mucous membrane is seen to be considerably congested, but if the part be examined twenty minutes or half an hour later, the membrane, though swollen, is generally pale. Sometimes the membrane bleeds slightly when the crusts are removed, and occasionally, though very rarely, the dried mucus adheres to the surface of superficial ulcers. It is important, however, to bear in mind that ulceration is a purely accidental complication, and in no way essential to the complaint.

The symptoms of *ozæna* are the same as those which have just been described as belonging to dry catarrh, but there is, in addition, a peculiar fœtor. In the ordinary form of ozæna the thin flakes of dried secretion already described are met with, but in some cases round or oval lumps from two to three centimetres in length, and from one to two centimetres in width, are slowly formed and expelled at intervals of a week or ten days. These masses are generally of a dirty white or green colour, but they may be brown or even black, their colour depending on the length of time the secretion has been retained, and on accidental circumstances, such as discoloration by carbon in the air, or by slight accidental bleeding.[1] They are of somewhat dense structure, moist externally, but dry and very compact in the centre. When they attain a certain size, it would seem that by pressing on the mucous membrane, they excite a liquid secretion, which facilitates their expulsion. These masses, when they form in the nose, generally collect in its vault in the neighbourhood of the superior turbinated body, but they sometimes accumulate in the naso-pharynx.

---

[1] An extraordinary case is related by Gallway ("Lancet," October 15, 1859), in which a lady occasionally blew out of her nose a black sooty powder, dry, and insoluble in water. This occurred five times in the course of nine months, and was not accompanied by pain or uneasiness of any kind. The patient had not used charcoal in any way. It may be stated that she was a woman of nervous temperament, from thirty-five to forty years of age.

It would be no doubt desirable, if possible, to describe the stench of ozæna, but I know of no way in which an odour can be described except by comparing it with some other smell, and in this instance there is no stench to which it bears the faintest resemblance.[1]

Diagnosis.—It is very important to distinguish true ozæna —*i.e.*, dry catarrh with fetid secretions—from cases in which there is ulceration of the mucous membrane or disease of the bones. Careful examination with the speculum will usually enable the observer to detect any morbid alteration in the skeleton, but Eugene Fränkel has shown that in some cases the necrosis may be so slight as to escape observation during life. Washing out the nose with a detergent spray will generally completely remove the smell, if the case is one of true ozæna, but if there is diseased bone the stench, though milder, can still be detected. Fetid discharges occur in cancer of the nose, in tubercular disease of the pituitary membrane, and in lupus exedens of the Schneiderian membrane; but these diseases are happily all rare, and a knowledge of their distinctive features will prevent the practitioner confusing them with simple ozæna. In all cases in which there is an offensive smell a careful search should be made for a foreign body, instances having often occurred in which such a condition has simulated ozæna. A very remarkable example has been reported by Tillaux[2] where a cherry-stone impacted in the nasal cavity gave rise to an odour resembling ozæna, which disappeared on removal of the stone two years after the date of its introduction. Cases are also related by Holmes Coote[3] in which a fetid discharge from the nose was found to depend on the presence, in one instance, of a plum-stone, and in another of a boot-button. On their removal the discharge from the nose at once ceased.

Pathology.—The changes occurring in dry catarrh and ozæna have been considered, to some extent, in dealing with the etiology. Atrophy appears to be always a secondary affection, or, in other words, the changes are of a quasi-cirrhotic character, resulting from previous inflammatory thickening. The recent investigations of Zuckerkandl[1] prove that not only the soft tissues, but also the bony structure of the turbinated body becomes thinner, more elastic, flatter, and smaller. The mucous membrane shrinks and becomes wrinkled, the erectile tissue disappears, and the thin, pale, shining mucosa looks more like serous than mucous membrane. When the morbid process is far advanced, nothing is left but thin bands of mucous membrane, occasionally, perhaps, containing some small osseous fragments—the remains of the spongy bones. Schäffer, who, in some cases, has been able to watch the whole process, found the hypertrophic stage last from eight to ten years before any wasting set in. No doubt, however, the disease sometimes passes through its various phases much more rapidly, and I have occasionally seen the atrophic condition reached in the course of a few months. Bayer,[2] of Brussels, has observed hypertrophy in the children of patients who have themselves arrived at the atrophic stage. Both Schäffer and Ziem[3] maintain that ozæna may exist without atrophy, and there is no doubt that atrophy may occur without ozæna. I have already (see Etiology) stated my own experience as regards this matter, but may add here that I recently saw a girl, aged eighteen, in whom there was marked atrophy of the turbinated bones with corresponding enlargement of the nasal channels, but without the least trace of ozæna. Yet the patient assured me that the symptoms of dry catarrh had existed since she was four or five years old.

---

[1] The French call the complaint *punaisie*, in addition to the equivalent term placed at the head of this article, and some writers affirm that this word is derived from *punaise*, the common bed-bug, and that the stench of ozæna resembles that caused by the crushed insect. But there is in fact no resemblance between the smells, and the two words *punaise* and *punaisie* are simply derived from the same source, *puer*, to stink (adj. *punais*). Any person who has once perceived the characteristic odour of ozæna will always readily recognize it again.

[2] "Bull. de la Soc. de Chir." Jan. 26, 1876.

[3] "Holmes's System of Surgery." London, 1870, 2nd ed. vol. ii. pp. 423, 424.

Gottstein[4] has reported a case in which he made an autopsy on a patient who had suffered from ozæna. The subject was a young woman, twenty-four years old, afflicted with insanity, who died of caseous pneumonia. During life, Gottstein observed that the nasal passages were extremely wide, and after the removal of a quantity of stinking crusts, the mucous membrane was seen to be pale, thin, and free from ulceration. At the post-mortem examination the bones and cartilages, unfortunately, could not be examined ;

---

[1] "Normale und pathol. Anatomie der Nasenhöhle." Wien, 1882. p. 87. et seq.

[2] "Trans. Intern. Med. Congress." London, 1881, vol. iii. p. 314.

[3] "Monatsschrift fur Ohrenheilkunde." 1880, No. 4.

[4] "Breslauer arztliche Zeitschrift," Sept. 1879. Nos. 17 and 18, p. 6

but the mucous membrane, so far as it was accessible by very careful examination, showed no defect, except a certain thinness. On microscopic investigation the epithelium was found to be normal; beneath this there was a layer of small round cells mixed with a few spindle-shaped cells, and beneath this stratum again was another of fibrillar areolar tissue generally lying parallel to the surface, the fibrillæ being here and there collected into bundles in different stages of development. The vessels were richly developed, and the elastic tunic of the arteries thickened. The glandulæ were numerous; their contents were hazy and infiltrated, the gland-cells not being recognizable in some places, whilst in others they were misshapen and scarcely discernible. As Gottstein[1] remarks, "the appearances were those of chronic rhinitis, with more or less advanced cirrhosis of the mucous membrane, and a partly infiltrated and atrophied condition of the glandulæ." Krause[2] found a horny condition of the epithelium, atrophy of the mucosa, and degeneration of that structure into a kind of dense connective tissue, diminution in the number of blood-vessels, more or less obliteration of those that remained, through thickening of the *adventitia* and puckering of the *intima*. He found the glandulæ generally deficient, and those that were left showed fatty or granular degeneration. Zaufal[3] is of opinion that the diminutive volume of the osseous structures is not due to atrophy, but to their retaining their infantile dimensions, whilst the face in general undergoes its normal development.[4] This, according to Zaufal, explains the frequent occurrence of ozæna at puberty, when the arrest of development suddenly becomes manifest, owing to the maturation of the contiguous parts. The theory of non-development has, however, recently been ably combated by Zuckerkandl,[5] who, in examining 252 skulls of young subjects, met with only one in which the turbinated bones were of insufficient size, and in this case there was a clear history of atrophy having taken place.

The mucus of ozæna has been made the subject of investigation by several physicians. Frank[1] repeatedly examined fresh specimens from the nares of Michel's patients suffering from ozæna, but he never found anything more than pus-corpuscles, granular *débris*, and some traces of epithelium. On the other hand, Krause[2] maintains that the newly-formed mucous cells undergo fatty degeneration before they are detached from the surface of the pituitary membrane, rendering the secretion viscid, and disposed to fetid change. He observed that in the membrane thus degenerated, well-formed cells are not found, but in their place collections of fatty corpuscles and pigmentary molecules, which constitute the dried mucus of the adherent crusts. Subsequently the fatty matter becomes acid, and gives rise to the characteristic odour of ozæna. This view, however, is not borne out by the observations of Eugene Fränkel,[3] who found no fat in three cases of undoubted ozæna which he had an opportunity of examining after death.

---

[1] "Breslauer ärztliche Zeitschrift," Sept. 1879, Nos. 17 and 18, p. 6.

[2] "Virchow's Archiv. f. path. Anat." Bd. lxxxv. Hft. 2.

[3] Loc. cit.

[4] A supposed case of non-development of the turbinated bones had been previously recorded by Hyrtl ("Sitzungsber d. kk. Akad. in Wien." Bd. xxxviii.), but it was not reported as bearing on the question of ozæna.

[5] Op. cit. p. 90.

Prognosis.—Dry catarrh is always a very obstinate affection, whilst true ozæna is rarely, if ever, cured, except in the case of young children, in whom the disease sometimes passes away after it has existed for a few weeks. Ozæna can, however, be so completely kept in check by the treatment hereafter recommended, that it practically causes no inconvenience beyond the necessity of using a detergent wash or spray once or twice a day, or a tampon for a few hours daily. The stench diminishes in intensity as age advances, and about fifty generally ceases altogether.

Treatment.—In dry catarrh and ozæna the first step is to get rid of the crusts. This may be done by washing, douching, syringing, or spraying the nasal fossæ (see "Nasal Instruments," pp. 258—265).

The best solutions for washes and douches are the Collunarium sodæ, the C. acidi carbolici, the C. acidi carbolici cum sodâ et borace, or the C. potassæ permanganatis of the Throat Hospital Pharmacopœia, the formulæ for which will be found in the Appendix. As a rule I prefer washes, as I find them much less disagreeable to the patient, and generally quite as efficient in their action. But when the crusts form in the vault of the nose both washes and douches fail. Here sprays will often be successful, but sometimes the simple spray-apparatus (see Figs. 44, 45, and 46), does not act with sufficient force, and if this be the case a pneumatic spray-producer (Fig. 47) should be employed. Any of the alkaline or disinfectant sprays of the Throat Hospital Pharmacopœia (see Appendix), answer the purpose well. If the spray be used in the morning and afternoon, it will entirely get rid of any smell, and generally after a few months it will be found sufficient to use it only once a day—in the morning. Resorcin, a derivative of phenol, allied to carbolic acid, but without its irritating properties or its offensive smell, has recently been tried by Masini,[1] who reports very favourably of its use in cases of ozæna. He first gets rid of the crusts on the nasal mucous membrane by means of douching, and then employs sprays of a watery solution of ½ per cent. of resorcin, applied twice a day during three or four minutes. The medicament may also be painted over the diseased surface in the form of a pomade, consisting of 30 decigrammes of resorcin to 10 grammes of vaseline. Massei[2] asserts that in some cases ozæna may be radically cured by means of resorcin; he prefers, however, to use it in the form of douche —2 grammes in 600 of water—rather than spray.

---

[1] Michel: "Krankheiten der Nasenhöhle." Berlin, 1876, p. 107.

[2] "Trans. Intern. Med. Congress," London, 1881, vol. iii. p. 311, et seq.

[3] Ibid. p. 313.

Gottstein has introduced an entirely novel mode of treatment. Noticing that it is only the *dried* mucus which smells, he has devised an ingenious arrangement for keeping the secretion *moist*. This consists in introducing a tampon of cotton-wool into the nasal passage, the contact of which with the mucous membrane causes a slight but constant flow of mucus. The tampon is easily introduced by means of a screw (see Fig. 73, p. 282), and need only be retained for a couple of hours in the morning on one side, and for the same length of time on the other side in the afternoon: occasionally, indeed, a shorter period will suffice. Should this method not succeed at first, it shows that the pledget of wool is not large enough. It is necessary, in fact, that it should be in thorough apposition to the mucous membrane. Several of my patients have worn these tampons for the last two or three years, not only without complaint, but with the greatest gratitude. It will be observed that this treatment is purely mechanical, but Woakes[3] has found *medicated* wools still more effectual, and a number of these are given in the Appendix.

The remedies which have hitherto been considered are of a palliative nature, but it is not surprising that in a complaint of so intractable and disgusting a character, a great many attempts should have been made to find a radical cure. Nor is it at all remarkable that iodoform should have been much vaunted. I have used this remedy in powder, dissolved in ether as a spray, and also in the form of a nasal bougie. I cannot say, however, that I have found it more effectual than simple alkaline and detergent lotions, whilst it labours under the disadvantage of causing an odour which, if less disgusting than that of ozæna, is certainly very penetrating. Remedies which stimulate the mucous membrane certainly do good, and sometimes permit the cleansing process to be carried out at longer intervals, though it cannot be dispensed with altogether. The red gum diluted with starch (1 part of gum to 2 of starch) has seemed to me the most useful of all these; but Bosworth[1] speaks most highly of sanguinaria (1 part to 3 of starch), and galanga (equal parts of the powdered root and starch). These powders should be blown into the nose after it has been washed out with a detergent spray. Galanga and sanguinaria somewhat resemble eucalyptus in their action, but are much more irritating. If employed at all, I should advise them to be used in a considerably more dilute form than that recommended by Bosworth.

---

[1] "Archivii Italiani di Laringologia." Anno ii. 1882. Octr. 15. pp. 71-7.

[2] Ibid. April 15, 1883. pp. 26-28.

[3] "Lancet." 1880, vol. i. p. 876.

The application of white heat to the mucous membrane, with the view of destroying the suppurating surface, has been advocated by Bernard Fränkel, but I have not had sufficient experience of this method of treatment to be able to speak with any confidence on the subject. I may state, however, that in three cases in which crusts have formed quite at the anterior part of the nose, a few applications of electric cautery so altered the character of the mucous membrane that the morbid process was entirely arrested.

CHRONIC BLENNORRHŒA OF THE NOSE AND AIR-PASSAGES.

A somewhat rare form of purulent rhinitis has been described by Stoerk,[2] under the name of chronic blennorrhœa of the mucous membrane of the nose, larynx, and trachea. He says that this condition is common among the Polish Jews in Gallicia, Poland, Wallachia, and Bessarabia. Most of the patients seen by him were poor, and attached little importance to personal cleanliness. According to Stoerk's account, in the first stage of this ailment there is a profuse secretion from the nose of more or less purulent greenish-yellow fluid, whilst the absence of the vascular injection and succulence generally met with in acute catarrh should prevent blennorrhœa from being confounded with coryza. The disease shows a marked disposition to extend through the pharynx to the larynx and even the trachea. In the nose the cartilages and bones are never involved, and the nasal affection itself is of little importance except in so far as it is the starting-point of serious disease which ultimately invades the respiratory passages. In the larynx, the ulceration frequently commences at the stalk of the epiglottis, and this spreads down into the larynx, involving the edges of the vocal cords near the anterior commissure, and often leading ultimately to adhesion between the two cords. In this way the glottis is reduced to a small crescentic opening, the concavity of the crescent being directed backwards. A web is likewise frequently formed in the larynx below the level of the vocal cords, and the disease often involves the wall of the trachea and may even extend to the minute bronchial tubes, where it occasionally gives rise to hæmoptysis. No treatment is of much avail, but tracheotomy has been performed with temporary benefit, and in some rare cases the induration has spontaneously disappeared.

---

[1] Op. cit. pp. 216, 217.

[2] "Krankheiten des Kehlkopfs." Stuttgart, 1880, p. 161.

BLEEDING FROM THE NOSE.

(SYNONYM: EPISTAXIS.)

Latin Eq.—Hæmorrhagia narium ; epistaxis.
French Eq.—Saignement du nez ; epistaxis.
German Eq.—Nasenbluten.
Italian Eq.—Epistassi.

DEFINITION.—*Hæmorrhage from the nose originating either in the nasal cavity proper, or in the sinuses communicating with it.*

History.—Bleeding from the nose was considered by the old physicians as a symptom of more valuable import than modern practitioners usually accord to it. It is referred to by Hippocrates[1] as indicating a favourable crisis in acute fevers, or as being ominous of a fatal result in certain chronic diseases. He was also acquainted[2] with the frequent connection of hæmorrhage from the nose with enlargement of the spleen, and other abdominal viscera, and with its occasional vicarious occurrence in cases of suppressed menstruation.[3] Galen[4] considered it as a natural relief to vascular tension in fevers, and he mentions a case in which he was able to predict a flow of blood from one nostril in the course of an acute fever, accompanied by delirium. He recommended[5] that epistaxis should be stopped by squeezing the nose tightly with the fingers, or, if this failed, by pushing a pledget of lint or a piece of dry sponge as far into the nostril as possible. Aretæus[6] regarded nasal hæmorrhage as indicative of resolution in acute pleurisy; and he advised that, for the relief of headache, bleeding from the nose should be artificially induced by means of instruments devised for the purpose.[7] It may, indeed, be gathered from the writings of Paul of Ægina,[8] that this was a common therapeutic measure among the ancients. In the seventeenth century Fabricius Hildanus[9] related many cases of bleeding from the nose which he had treated generally with a styptic powder of his own invention. Not long after, Sydenham,[10] whilst expressing a great contempt for local hæmostatics, urged that blood-letting was the true principle on which epistaxis should be treated. In the eighteenth century, the celebrated Hoffmann[11] devoted a chapter of considerable length to the subject of nasal hæmorrhage; whilst Morgagni,[12] though referring to the affection very briefly, quotes an observation of Valsalva as to the immediate source of the bleeding in many cases, which is of great practical importance, and which will be cited further on. To Bellocq[13] we owe the extremely valuable invention for plugging the posterior nares which bears his name. Nasal hæmorrhage was classed by the nosologists of last century as a substantive disease, and the term "epistaxis," used by the older writers for every kind of hæmorrhage occurring drop by drop, was first proposed by Vogel[14] to be confined to bleeding from the nose. This term was subsequently adopted by Cullen[15] and Pinel,[16] and soon came into general use. In the early part of the present century J. P. Frank[1] treated the subject with great fulness, and with much practical sense. He arrested bleeding by pushing into the nostril a piece of dried hog's intestine, tied at one end so as to form a pouch like the finger of a glove, and distending this by injecting water with a syringe, the proximal end of the gut being then tied, and the plug left in position as long as required. This simple appliance has been frequently imitated since in more elaborate forms. A lengthy chapter, full of curious, but somewhat undigested, erudition concerning epistaxis, or hæmorrhinia, as he preferred to call it, will be found in Cloquet's[2] work, which has been already referred to several times in this volume. Some valuable remarks on epistaxis, especially as regards its connection with other hæmorrhages, were made by Laycock[3] in 1862, and in the same year Rawdon Macnamara[4] published an elaborate article which embodied the results of an unusually large experience of the complaint, and contained many useful suggestions as to treatment.

---

[1] "Epidemiorum." lib. i.

[2] "Prorrheticorum." lib. i. cap. viii.

[3] "Aphorism." Sect. 5.

[4] "De crisibus."

[5] "De compos. pharm. sec. locos." lib. iii. ch. iv.

[6] "On the Causes and Symptoms of Acute Diseases," Bk. i. ch. ix. Syd. Soc Transl.

[7] "On the Treatment of Chronic Diseases," Bk. i. ch. ii. Syd. Soc. Transl.

[8] "Works." Syd. Soc. Transl. vol. i. p. 326.

[9] "Opera Observ. et curat. medico-chirurg. quæ extant omnia." Francofurti 1682.

[10] "Med. Observ." ch. iv. 48 and 49; and "Processus Integri," ch. xlv.

[11] "Medicinæ Ration. System." Pars. Secund. Sect. prima c. i; Hoffmann's "Op. omnia Physico-Medica," p. 196, et seq. Genevæ, 1740.

[12] "De sedibus et causis morborum." Epist. xiv. Art. 23. Patavii, 1765.

[13] I have not been able to find the exact date of the invention of this instrument, but it certainly was in use at the commencement of the present century for it is mentioned by Deschamps in his thesis "Des Maladies des Fosses nasales," which bears date 1804.

[14] "Definitio generum morborum." Gottingæ, 1764. The term ἐπίσταξις was used by Hippocrates to signify bleeding drop by drop, but was not applied especially to hæmorrhage from the nose.

[15] "Synopsis nosologiæ medicæ." Edinburgi, 1785. Ed. Quart.

[16] "Nosographie philosophique. Paris, 1818, 6me ed. t. ii. p. 289

---

[1] "De curandis hominum morbis." Mannhemii, 1807, lib. v. pars. 2. p. 124. et seq.

[2] "Osphrésiologie." Paris, 1821.

[3] "Lectures on the Physiognomical Diagnosis of Disease."—"Med. Times and Gaz." 1862, vol. i. p. 501.

[4] "Dublin Quarterly Journ. of Med. Science," 1862, vol. xxxiii. p. 43. et seq.

Etiology.—Epistaxis is decidedly more common in men than in women, possibly, as suggested by Hoffmann,[1] because in the case of the latter there is a periodical depletion by the monthly discharge. It is also more frequent in childhood and old age, than in the prime of life; the bleeding, as will presently be shown, being usually due to plethora in the child, and to degenerative changes in the vascular system in the old. The period of life at which nasal hæmorrhage is absolutely most frequent is probably about the time of puberty. The causes may be local or constitutional. Amongst the former the most frequent is direct violence from blows or falls, but sneezing or blowing the nose will often cause bleeding. "Picking" the nose is a common cause of epistaxis in young persons, whilst the introduction of foreign bodies, such as a piece of wood or slate-pencil, has sometimes led to severe hæmorrhage in children. In the same way, troublesome bleeding occasionally occurs from the passing of nasal bougies. If there be any ulceration of the nasal mucous membrane a very slight strain may cause blood to flow from the nose. Fibrous tumours of the naso-pharynx and malignant growths are especially apt to induce epistaxis. Irritant particles in the air, such as arise from strong ammonia, jalap, and ipecacuanha, when drawn into the nose in breathing, often cause hæmorrhage from the nasal mucous membrane, and strong snuff has also been known to produce this effect.[1] Some curious idiosyncrasies are recorded of epistaxis being brought on by extraordinary causes. One of the most remarkable of these is the case of John a Querceto, a secretary of Francis I., who is stated, on good authority,[2] to have bled at the nose if he smelt an apple.

---

[1] Op. cit.

Constitutional causes are of four kinds: 1st, the blood itself may be altered in constitution; 2ndly, the vessels may be diseased; 3rdly, there may be obstruction to the circulation through the lungs, liver, kidneys, or other organs, causing a sudden tension or strain of the whole system which gives way at a weak part, viz., the nose, where the vessels are very superficial and their arrangement is in places cavernous (see Anatomy, p. 236); 4thly, the blood-flow may be a vicarious discharge.

(1.) The most common cause of bleeding under this head is the hæmorrhage diathesis, or hæmophilia, the nose being the part from which the flow most frequently takes place in such cases. Laycock[3] found that out of 227 "bleeders" the source of the hæmorrhage was the nose in no fewer than 110, whilst in many of these cases epistaxis alternated with hæmoptysis, hæmatemesis, and hæmaturia. In all anæmic conditions of the system, epistaxis is apt to occur. Out of eighty-one cases of leukæmia collected by Mosler,[4] there was hæmorrhage in sixty-four instances, and in thirty-five of these the blood came from the nose.

When the blood is abnormally abundant, as in plethoric children, hæmorrhage from the nose is not unfrequent, being often preceded by a sensation of fulness in the head scarcely amounting to headache. Owing to the intercommunication between the veins of the nose and the sinuses of the dura mater, epistaxis often gives great relief in these cases.

In eruptive and relapsing fevers, bleeding from the nose is by no means an uncommon symptom. In a severe epidemic of relapsing fever occurring in Berlin in 1871-72, which was carefully studied by Felix Semon[5] in the Charité

---

[1] Macnamara: Loc. cit. p. 30.

[2] Bruyerinus: "De re cibariâ." Francofurti, 1600, lib. xi. cap. xvi. p. 468.

[3] Loc. cit.

[4] "Leukæmie." Berlin, 1872.

[5] "Zur Recurrens-Epidemie in Berlin, 1871-72." Inaug.-Dissert, 1873.

Hospital, epistaxis was a critical symptom in more than 30 per cent. of the cases. In two instances the hæmorrhage continued for two or three days, and in the case of one extremely exhausted patient it was the actual cause of death. In scurvy it is usually stated to be very common. J. P. Frank[1] goes so far as to assert that in his own experience it has occasionally been the only symptom of this disease, and he looked upon epistaxis as of the highest diagnostic importance in relation to scurvy when taken in conjunction with the previous history of the patient. I am informed, however, by Mr. Johnson Smith,[2] who has had the amplest opportunity for observation during a connection of fourteen years with the Dreadnought Hospital, that in his experience epistaxis is by no means a frequent feature in scurvy. In purpura, however, nasal hæmorrhage sometimes takes place. A remarkable case occurred in my own practice a few years ago. The patient, a middle-aged man, had lived for many years in the tropics, and had lately returned home in bad health. He was first attacked with hæmorrhage from the larynx. This yielded after a time to spray inhalations of tannin, but the arrest of the laryngeal bleeding was followed almost immediately by such severe epistaxis that the posterior nares had to be plugged. After two days alarming hæmorrhage came on from the lungs, and Dr. Walshe saw the patient with me. Under the use of large doses of ergot the hæmoptysis ceased, but thirty-six hours later the patient died from sanguineous apoplexy.

Both in acute yellow atrophy of the liver and in phosphorus poisoning, the general symptoms and morbid anatomy of which bear so singular a resemblance to each other, a rapid softening and fatty degeneration of the walls of the vessels take place, and under these circumstances epistaxis is not uncommon.

(2.) When the vessels have undergone atheromatous change, hæmorrhage from the nose is not unfrequent. This is, of course, most often met with in elderly persons, but it may also occur in younger persons who have suffered from constitutional syphilis or chronic alcoholism.

(3.) The effect of strain on the vascular system is seen even in healthy persons after violent exertion, such as lifting heavy weights, violent coughing, retching, or running.[3]

---

[1] Op. cit. p. 135, et seq.

[2] Private communication, dated December 23, 1881.

[3] In the horse, epistaxis caused by strain may sometimes be

This cause of nasal hæmorrhage is likely to be intensified if there be at the same time any artificial obstruction to the return of the blood through the jugular veins. Epistaxis accordingly often occurred in the old days when tight stocks were worn. The same effect is sometimes produced by tumours in the neck, especially goîtres. Venous obstruction from engorgement of the right side of the heart, emphysema, or severe chronic bronchitis, sometimes causes epistaxis. Diseases of the liver, kidney, and spleen are also frequently complicated by troublesome nasal hæmorrhage. Strong emotion[1] sometimes gives rise to hæmorrhage from the nose, the immediate cause probably being sudden tension of the vascular system, which gives way at the point of least resistance. A striking example of epistaxis from rage is related by Macnamara of a young man, whom profuse nasal hæmorrhage seems to have saved from an impending fit of apoplexy. It is more difficult to explain another case reported by the same writer, in which a girl was brought to the verge of death by bleeding from the nose, which she attributed to grief for the death of her father.

(4.) Epistaxis sometimes occurs vicariously, taking the place of the menstrual flow in women, or of some periodical escape of blood from enlarged veins in the rectum, leg, or elsewhere. Fränkel[2] has collected a number of interesting examples of vicarious bleeding from the nose. In one of these (Fricker's case) a girl, who had never menstruated, suffered at intervals of six weeks from such profuse nasal hæmorrhage, accompanied by menstrual molimina, that she finally died from exhaustion. In another (Sommer's case), a woman on one occasion, during the entire period of gestation, had a discharge of blood from the nose regularly once a month. In a third

---

observed on the race-course and in the hunting-field. Mr. Doyle (Macnamara, loc. cit.) a veterinary surgeon, speaks of two fatal cases of epistaxis in horses, and mentions a celebrated racer which never ran without bleeding from the nose.

[1] Loc. cit. p. 32. The curious case related by Hildanus (op. cit. cent. ii. obs. xvii.) of a plethoric, newly-married young man, who was seized with furious bleeding from the nose immediately after coition, perhaps comes under this head, but the etiology is complicated by the fact that the patient had been exposed for some time to a burning sun. The peculiar effect of great mental emotion in producing epistaxis did not escape the notice of Dickens, who, in "Our Mutual Friend," speaks of a spontaneous gush of blood from the nose of Bradley Headstone, when pursuing Eugene Wrayburn with the intention of murdering him.

[2] "Ziemssen's Cyclopædia," vol. iv. p. 152.

instance (Obermeier's case), epistaxis appears to have entirely taken the place of the normal uterine hæmorrhage in a young woman; it came on at regular intervals of four weeks with the usual constitutional symptoms, ceased during pregnancy, and recurred after delivery. In some of Mosler's cases of leukæmia already referred to, the epistaxis was more or less menstrual in character. Puech[1] also gives several instances of catamenial epistaxis. Hoffmann[2] relates a case of somewhat analogous nature in which the lochial discharge was suppressed very shortly after parturition, and the patient died of epistaxis. An instance is recorded by Fabricius Hildanus[3] in which epistaxis appeared to take the place of a periodical hæmorrhage from varicose veins of the leg in an old man, the flow continuing for twenty-four hours, and leaving the patient prostrate for months afterwards. Bleeding at the nose is sometimes hereditary, a fact which was known to Hoffmann,[4] and of which a striking example has been recorded by Babington.[5] Of six female children of a woman who was very subject to epistaxis, three suffered from this form of hæmorrhage. One of these had two daughters with the same tendency, the elder of whom had afterwards a son who also inherited the peculiarity. The authenticity of the case is vouched for by the fact that Babington himself was acquainted with the mother, daughter, and grandchild. It has been asserted that the disease occurs epidemically, and in proof of this an example referred to by Morgagni[6] is brought forward. This epidemic is supposed to have occurred in Italy in the year 1200, and it is stated to have proved fatal to an immense number of persons within twenty-four hours.[7] It is probable, however, that the violent hæmorrhage was only an early symptom of an epidemic fever.

Symptoms.—There is little to be said under this head, except as to the mode in which the hæmorrhage occurs, and the amount of blood lost. It may be remarked, however, that certain prodromata are often present, especially in plethoric persons and in those suffering from fevers. These signs consist of a feeling of fulness in the frontal region, flushing of the face, throbbing of the temporal and carotid arteries, buzzing of the ears, giddiness, and a sensation of itching in the nose. According to Hippocrates,[1] there is also abdominal distension, an observation confirmed by Pinel,[2] who adds that "goose-skin" and coldness of the extremities are likewise often premonitory of epistaxis. The hæmorrhage usually takes place drop by drop, and from this fact the modern scientific name, as already shown (see History), is derived; but sometimes the blood flows so copiously that it might be supposed that a large vessel had given way. The bleeding generally comes from one nostril, and it is only when there is some great alteration of the blood, as in fevers or allied conditions, that the flow is bilateral. Occasionally, however, the blood escaping from one nasal passage may find its way round the septum posteriorly, and issue from the other nostril, a phenomenon probably due to the formation of clots at the back of the nose. The blood is of bright red colour, and the quantity lost varies usually from two or three drachms to an ounce, though sometimes much more considerable. Thus Martineau[3] relates a case in which the bleeding is said to have amounted to twelve pounds in sixty hours; whilst, in another instance, it is affirmed[4] that seventy-five pounds of blood trickled away in the course of ten days. In a case related by Rhodius,[5] a young man is stated to have lost eighteen pounds in thirty-six hours; and Hildanus[6] reports an extraordinary instance of a man, who, besides losing several pounds of blood from his nose, in the course of a few hours afterwards vomited twenty-seven pounds which had flowed from the posterior nares, and coagulated in his stomach. There can be little doubt, however, that some of these statements are grossly exaggerated. The hæmorrhage sometimes give rise to very alarming symptoms, and the patient may pass into a state of dangerous syncope; or, if the epistaxis occur frequently, it may cause systemic anæmia of a very serious character.

---

[1] "Gazette des Hôpitaux." 1863, p. 188.

[2] Op. cit. p. 200.

[3] Op. cit. cent. ii. obs. xvi.

[4] Op. cit. p. 198.

[5] "Lancet." 1865, vol. ii. p. 362.

[6] Op. cit. epist. xiv. sec. 26.

[7] Gillchrist is referred to by Cloquet (op. cit. p. 557) as the authority for another supposed epidemic of epistaxis, but I have been unable to find the original report by Gillchrist, or any particulars of such an outbreak.

---

[1] "Epidemiorum," lib. i.
[2] Op. cit. p. 591.
[3] "Union Médicale." 1868, 3me série, t. vi. p. 330.
[4] "Acta Eruditorum." Lipsiæ, 1688, p. 205.
[5] "Observ. med. centuriæ tres." Francofurti, 1576, cent. i. obs. xc.
[6] Op. cit. cent. vi. obs. xiii.

Pathology.—The exposed position of the nose, and the peculiar cavernous arrangement of the vessels of the turbinated bodies, not less than the thinness of the mucous membrane covering those structures, fully explain the frequency of bleeding from the nose as compared with hæmorrhage from other parts Valsalva[1] observed in the dead-house that the vessels on the outer wall of the nose at the junction of the lateral cartilages are often very large, and J. P. Frank[2] states that he has noticed a varicose condition of the veins of the nasal mucous membrane in patients subject to epistaxis.

Diagnosis.—In all cases of epistaxis it is very important to make a careful examination of both nostrils and of the naso-pharynx, in order to ascertain whether there be any local condition, such as a tumour or an ulcer, which may cause the hæmorrhage. It is scarcely necessary to point out that after falls or blows on the head epistaxis may be a symptom of fracture of the base of the skull through its anterior fossa.

Prognosis.—In giving an opinion as to the danger of epistaxis regard must first be had to the immediate risk from actual loss of blood. This, of course, will depend on the state of the pulse and the general condition of the patient. After this it must be determined whether the hæmorrhage is accidental, *i.e.*, quasi-traumatic, or whether it is the result of some serious degenerative change in the walls of the arterioles, or whether it is due to obstruction in the pulmonary or hepatic circulation, or a combination of these conditions. It must not be forgotten that epistaxis, as Hughlings Jackson[3] has shown, may in some cases precede retinal hæmorrhage and apoplexy. Accidental bleeding is seldom of serious import, for although amongst the older writers a considerable number of cases are to be found in which death resulted from nasal hæmorrhage, the introduction of posterior plugging has to a great extent removed all danger. In elderly people, when epistaxis occurs spontaneously or from some very slight cause, it is generally a sign of degenerative changes in the vessels, and as such must be considered serious. In certain cases the bleeding appears to be beneficial, and its sudden stoppage is not unlikely to lead to mischievous results. Instances are on record in which mania,[1] epilepsy,[2] and asthma,[3] are said to have ensued as a consequence of rash interference with this natural depletion, and in cases of phthisis, renal disease, and cerebral mischief, the flow of blood from the nose sometimes appears to do good. So obviously beneficial, indeed, is epistaxis, in some cases, that, as already stated, its artificial production was a constant practice among the ancients for the relief of certain cerebral symptoms, and was recommended for this purpose by the enlightened Hoffmann.[4] In malarial fevers the old physicians considered that bleeding from the nose was an evidence of crisis, and was usually of happy augury for the patient, whilst in fevers of a low type it was looked upon as of dangerous import. In diphtheria, especially, it is a most grave symptom, being generally quickly followed by the development of false membrane in the nasal fossæ, if this extension has not preceded the epistaxis.

---

[1] Quoted by Morgagni: Op. cit. ep. xiv, sec. 23.

[2] Op. cit. p. 141.

[3] "London Hospital Clinical Lectures and Reports." 1866, vol. iii, p. 251.

Treatment.—Sir Thomas Watson has well observed[5] that nasal hæmorrhage is "sometimes a remedy; sometimes a warning; sometimes really in itself a disease." The question as to the advisability of arresting the hæmorrhage must therefore first be considered. On this point some remarks by Peyer[6] may be found worthy of attention, even at the present day. He observes that plethoric youths, in whom bleeding from the nose is too quickly stopped, are prone to be attacked with pains about the head and in the ears, and with various catarrhal affections. Hence hæmorrhage in these cases should not be interfered with, unless it is excessive, and produces faintness, pallor, and coldness. Again, where there is great venous obstruction, as in certain cases of cardiac and pulmonary disease, in cirrhosis of the liver, or in women where the hæmorrhage takes the place of the monthly flow, the physician should be in no hurry to interfere, unless the bleeding lasts too long.

When it has been determined that it is desirable to arrest the hæmorrhage, measures should be adopted in proportion to the activity of the flow. In the great majority of cases the bleeding soon ceases spontaneously, or if not, it can be stopped by some simple expedient. Position has obviously an important influence, and nothing can be worse than the common practice of holding the head over a basin. Jamain[1] has pointed out that not only is the flow increased by gravitation, but that the flexion of the head tends to compress the jugular veins, thereby hindering the return of the blood from the head, and favouring the hæmorrhage. Hildanus[2] appears to have placed great faith in tightly bandaging the forearms to the arms and the legs to the thighs, and in very obstinate cases swathing the whole body in tight wrappings.[3] It is not improbable, however, that the success of this remarkable method was in some measure due to the fact that he used styptic powders at the same time. Keeping the patient on his back in the horizontal position is a simple procedure which I have often seen practised with excellent results. With the view of diminishing the flow of blood to the head, the very opposite plan, however, viz., that of maintaining the patient in an erect attitude, has been tried and found no less efficacious. A method has been recommended by Négrier[4] as being highly successful, which consists in raising the arm corresponding to the bleeding side above the head, and compressing the nose with the fingers of the other hand; but it is probable that *the pressure on the source of the hæmorrhage*, like Hildanus's powder, is the real influence brought to bear. Négrier himself, however, considered that the extra strain put upon the heart to drive the blood to the end of the raised limb lessens the force of the current to the nose sufficiently to diminish the hæmorrhage. The plan has at any rate the merit of requiring no apparatus whatever, so that it can be practised under all circumstances. The application of cold yields good results. It can be made either directly to the nose, or to other parts more or less remote, such as the brow, the nape of the neck, the feet, or hands. The time-honoured household remedy of putting a large key down the neck acts in this manner. A more certain plan consists in applying cold water or ice to the nose itself, or to the forehead. The patient may be directed to snuff up cold or (if it can be procured) iced water. Hildanus,[1] in a case which he considered desperate, took what he himself calls the extreme measure of plunging the whole body into a cold bath, with the result of instantly checking the hæmorrhage. The use of *hot* water, which in recent years has been highly recommended for restraining other hæmorrhages, has recently been advised for epistaxis by Keetley,[2] who says that the temperature of the water should be from 120° to 124° Fahr., and that it need not be syringed into the nasal cavity, but simply applied freely to the face.

---

[1] Van Swieten: "Comment. in Boerhavii Aphorismos." 1124.

[2] Hoffmann: "De Epilepsiâ," obs. i.

[3] Raymond: "Maladies qu'il est dangereux de guérir," p. 255.

[4] "Med. Rationalis Systema." "Opera omnia physico-medica." Genevæ, 1740, p. 200.

[5] "Practice of Medicine." London, 1857, 4th ed. vol. i. p. 793.

[6] "De morbis narium." Basileæ, 1766, p. 16.

---

[1] "Gazette des Hôpitaux." 1855. No. 33.

[2] Op. cit. cent. ii. obs. xv. and xvi.

[3] This method is still occasionally practised. Thus Blondeau ("Union Médicale," Dec. 8. 1877) claims to have checked bleeding from the nose by tying tapes tightly round the thigh when other measures had failed.

[4] "Arch. Gén de Méd." 1842. p. 168.

The local application of styptics is often of great use. Powdered tannin, alum, or matico-leaf, may be snuffed up by the patient, or blown into the nostril with an insufflator. This treatment is often at once successful, particularly if the nostril is previously syringed out with a little cold water. Sprays of tannic acid (gr. x. ad ℥j.) or perchloride of iron (♏ xx. ad ℥j.) have also often proved very effectual in my hands.

Pressure may sometimes be made directly on the bleeding spot by introducing the finger into the nostril, the source of the hæmorrhage being, in the majority of cases, on the outer wall, just inside the nose. Valsalva,[3] who, as has already been remarked, had observed on the dead subject that the veins on the outer wall of the nostril were often enlarged, used this ready method with striking success in a most obstinate case of nasal hæmorrhage. Epistaxis may sometimes be controlled by pressure on the facial artery on the bleeding side. But undoubtedly the most effectual method of applying pressure to the bleeding surface is by plugging. The bleeding nostril should first be plugged anteriorly, and if this prove insufficient, median or posterior plugging must be resorted to.

Anterior plugging is best effected by pushing small strips of lint into the nose with a probe until the front part of the cavity is completely filled up. The lint may be used dry, or may be steeped in a solution of perchloride of iron, or in a mixture of the tannic and gallic acids.[4] Josiah Smyly[5] found the following method of plugging very successful. He prepared several strips of lint about a foot in length, and half an inch in breadth, and wrapping about two inches of one of these round a slender probe, he passed it quite through to the posterior orifice of the nares, then withdrawing the probe, he carefully pushed in as many strips of lint as were required to fill the nasal cavity. He also suggested using tampons of absorbent wick, or blotting-paper. Should the hæmorrhage continue in spite of anterior plugging, recourse must be had to median or to posterior plugging.

---

[1] Op. cit. cent. ii. obs. xvii.

[2] "Practitioner." February, 1879.

[3] Quoted by Morgagni, op. cit. ep. xiv. sec. 23.

[4] The gargarisma acid. tann. et acid. gallici of the Throat Hospital Pharmacopœia (Vol. i. Appendix, p. 577) is the best formula.

[5] In a letter quoted by Macnamara, loc. cit. pp. 53, 54.

Median plugging, as has been shown, was recommended by Galen, and his plan of introducing a piece of sponge into the nose may often be used with advantage. A uterine sponge-tent will be found very serviceable for this purpose, but the handiest instrument is Cooper Rose's ingenious little air-plug, which has already been described (Fig. 69, p. 280). On the whole, however, this plan does not appear to be so effectual as the combination of posterior with anterior plugging.

Posterior plugging may be most readily performed with the aid of Bellocq's sound; the manner of using this instrument has been already described in the article on "Nasal Instruments" (p. 277, et seq.). Another apparatus invented for the purpose by Martin Saint-Ange,[1] and called by him a *rhinobyon*, may also be referred to (p. 278).

Unfortunately the various ingenious appliances which have been described are seldom at hand just when they are wanted, and, moreover, those made of skin or india-rubber are apt to be out of order. Hence, when an emergency arises, the surgeon is generally obliged to make use of some more simple, if less perfect, apparatus. The posterior nares can, however, be easily plugged by means of an elastic, or a silver female, catheter in the following manner:—A small piece of thread is fastened through the eyes of the catheter, and to this a strong silk ligature or piece of whip-cord is attached. The instrument is passed along the floor of the nose, and when the string is seen in the pharynx, it is seized with the fingers or with forceps, and drawn out through the mouth. A pledget of lint is attached to the middle of the string projecting from the mouth, and the nasal end is then firmly pulled till the plug comes in contact with the posterior nares, and blocks up the orifice of the affected side. The string is subsequently retained in position by being fixed behind the ear with a strip of plaster. A small piece of string should be left hanging into the pharynx from the plug, by which it can be removed in due time. It is better to make the pledget of lint so hard as to be quite impervious, and to trust to mechanical pressure rather than to saturate the lint with a styptic solution. For unpleasant, and even serious consequences, may sometimes follow the use of a styptic plug, especially if perchloride of iron is employed. Even dry plugging is not altogether free from danger, Créquy[1] having reported a case in which extensive gangrene of the soft parts of the face came on almost immediately after this operation. Colles[2] saw tetanus result from plugging, and Habershon[3] states that he had met with a case in which pyæmia ensued. Gross[4] also mentions that he was acquainted with several cases in which death had resulted from blood-poisoning after plugging. These instances, however, appear to me only proofs of the danger of allowing the plug to remain too long *in situ*. Another possible danger is erysipelas, which, according to Monneret,[5] has been observed in several cases. The plug should not, as a rule, be left longer in the nose than forty-eight, or at the most seventy-two, hours, and it should be removed very gently, so as not to disturb the clot, and bring on further hæmorrhage. Very gentle irrigation through the healthy nostril with tepid water, to which common salt has been added in the proportion of a drachm of salt to a pint of water, will assist in loosening the plug. After its removal the nose should be gently washed out daily, or on alternate days, with some disinfectant or mild astringent solution, such as permanganate of potash (gr. ij. ad ℥j.) or carbolic acid (gr. iv. ad ℥j.).

---

[1] Lapeyroux: "Méthode pour arrêter les Hémorrhagies nasales." Thèse de Paris, No. 314. 1836. A similar instrument was invented by Küchenmeister, and called by him a *rhineurynter* ("Berlin klin. Wochenschrift," May 29, 1871). See also Closset (Ibid. June 19, 1871), and Bruns (Ibid. July 31, 1871).

Constitutional Treatment.—As the control of the bleeding is entirely in the power of the surgeon, medical measures are seldom needed. It is only in cases where the hæmorrhage is frequent, but scarcely sufficiently serious to call for surgical treatment, that some internal styptic may be required. The best of these is ergot, which may be either given by the mouth or injected subcutaneously. Thirty drops of the tincture may be taken every two or three hours, or ten minims of a solution (one in five) of ergotine may be administered hypodermically every four hours. I have frequently found this method very useful. Laudanum is also an excellent astringent given in small doses of five to eight drops two or three times a day, but it is, of course, contra-indicated where the epistaxis originates in pulmonary obstruction. Other styptics, such as acetate of lead and gallic or sulphuric acid, can also be used for the purpose.

---

[1] "Gazette des Hôpitaux." 1870. No. 56.
[2] Quoted by Macnamara, loc. cit. p. 58.
[3] "The Lancet." February 27, 1875.
[4] "System of Surgery." Philadelphia, 1882. 6th ed. vol. ii. p. 283.
[5] See Martineau: "Union Médicale." 1868. 3me série. t. vi. p. 330.

With a view of increasing the density of the blood, it has been recommended to administer sulphate of soda,[1] of which two drachms may be given every three hours, but I have never tried this remedy. Should the patient, when he comes under notice, be so exhausted that fatal syncope is to be feared, transfusion should, if possible, be carried out. Mosler[2] relates a case of hæmophilia in which not only was the epistaxis arrested by transfusion, but the tendency to repeated hæmorrhage on slight occasions was altogether subdued. Both Sydenham and Hoffmann recommended venesection for plethoric persons who bleed from the nose, and it appears to have been occasionally employed by J. P. Frank,[3] but this mode of treatment is only mentioned here to be absolutely condemned. In illustration of its utter futility, Fränkel relates an instance in which epistaxis actually occurred in a girl, during the operation of transfusion, for which she had offered herself as a subject.

In the plethoric cases a saline purgative taken two or three times a week in the morning, followed by a couple of doses of digitalis in the day, will be found serviceable. In the epistaxis of purpura, Macnamara asserts that turpentine is very efficacious, and he recommends that a wineglassful of spirits of turpentine in a tumbler of brandy or whisky punch should be administered to the patient as rapidly as he can be got to swallow it.

---

[1] Kunze: "Compendium d. prakt. Med." 4th. ed. p. 94.

[2] Op. cit. The views attributed to the various other authors from this point to the conclusion of this article will be found contained in their works, which have been previously cited in foot-notes.

[3] Op. cit. p. 140.

NON-MALIGNANT TUMOURS OF THE NOSE.

POLYPUS OF THE NOSE.

Latin Eq.—Polypi nasi.
French Eq.—Polypes du nez.
German Eq.—Nasenpolypen.
Italian Eq.—Polipi del naso.

DEFINITION.—*New formations, nearly always of myxomatous structure but sometimes containing a small amount of fibro-cellular tissue, usually pedunculated, round, oval, or pyriform in shape, of pale pinkish colour, semi-transparent, varying in size from a currant to an acorn, but occasionally larger, giving rise to more or less obstruction of the nasal passages, with its associated symptoms.*

History.—Nasal polypi have attracted attention from the earliest times, and they are referred to by nearly every writer on surgery from Hippocrates downwards. The Father of Medicine,[1] indeed, must have had a large experience in connection with these growths, for though his classification is somewhat fanciful, his suggestions for treatment are of a highly practical nature, and show considerable fertility of resource. He directed that evulsion should be practised in the following manner:—A piece of sponge of sufficient size to fill the nasal cavity having been selected, four strings, each one cubit in length, were attached to it, their free ends being tied together. A long flexible metal probe with an eye at one end was next passed through the nostril, and brought out at the mouth; the united ends of the strings were threaded through the eye of the probe, which was then drawn back through the nose. The strings were now seized by the operator, and by forcible traction the sponge was drawn through the nose, the mass of the polypus coming away with it. Whether the growths were removed by evulsion or with the cautery, Hippocrates afterwards applied a dressing consisting of honey, to which there was occasionally added some strong caustic, and this was kept in contact with the parts by means of small leaden plates inserted into the nostrils. In the case of hard polypi, Hippocrates[2] directed that the nostril should be slit open, in order that the tumour might be thoroughly extirpated, and the roots afterwards destroyed with the hot iron. Celsus[3] recommended that polypi should be destroyed with caustics or the hot iron, but he strongly disapproved of meddling with the harder tumours, which he considered malignant. Galen[4] described the disease as a preternatural growth, resembling in its nature the flesh of a polypus, and recommended the use of astringent local remedies in preference to the knife. Ætius,[5] on the other hand, advised that the cautery should be used for the destruction of polypi. Paul of Ægina,[1] who was an advocate of the knife, recommended the operator to dilate the patient's nostril with his left hand, while with the right he extirpated the polypus from the nasal passage by a circular sweep of a scalpel of peculiar shape. The mass was then to be withdrawn from the nose with the other end of the instrument, which probably ended in a hook. Abulcasis[2] directed that the growth should be drawn out of the nose as far as possible with forceps, and then cut off with the knife. The stump was afterwards to be scraped, so as to destroy the roots of the polypus. Guy de Chauliac[3] recommended that polypi should be removed by evulsion. To William of Salicet[4] belongs the credit of introducing the plan of strangulation of nasal polypi by tying a ligature tightly round the pedicle. He advised that the channel of the nose should be widened, if necessary, by means of sponge tents, or serpentary root, and that the tumour should be tied tightly as near its root as possible, with a thread of doubled silk. In cases where this was impracticable, the growth was to be extirpated by evulsion with forceps. In any case, the stump was to be destroyed by means of corrosive applications or the actual cautery. Arantius,[5] being dissatisfied with the treatment by the knife, also invented a kind of blunt forceps, with which he tore away the polypus. To obtain a better view of the parts, he always operated in a darkened room, a round hole in the shutter allowing the sunlight to fall into the patient's nose; or, if the day was dull, artificial illumination was procured from a lighted candle placed behind a phial of glass containing clear water. Fabricius ab Aquapendente[6] claimed to have invented an instrument for the removal of polypi of such excellence that "patients came to him from every side, with the firmest confidence of being cured." His invention appears to have been a pair of forceps, the cutting blades and shanks of which were deeply hollowed, so that when closed the instrument formed a kind of canula, through which a hot wire could be passed, or powder blown. To this surgeon has often been assigned the merit of having first proposed the evulsion of polypi with forceps; but this is certainly erroneous, for it has just been shown that William of Salicet[7] had recommended this method long before. It may be added indeed, that Fabricius himself made no claim to be the inventor of the *method*, but only of a particular instrument which was designed to *cut* polypi without the dangers attending the use of the *spatha*, or ancient scalpel. He may therefore, perhaps, be termed the inventor of "cutting forceps." In 1628 Glandorp[8] published a treatise on polypus remarkable for its erudition, and, moreover, containing a very accurate account of the affection. Boerhaave[9] afterwards propounded a theory that nasal polypi are formed by a prolongation of the lining membrane of the pituitary sinuses. His idea was that the secretion in one of the cells becoming from some cause or other too thick, does not escape properly from the cavity, which thus becomes filled up, till its lining membrane is protruded into the nasal fossa, where it is suspended as a membranous sac, filled with fluid or semi-fluid contents. Heister[1] explained the growth of nasal polypi by obstruction of one or more of the glands of the pituitary membrane leading to the formation of a tumour. Morgagni[2] may be mentioned as quoting with approval Valsalva's practice of removing the lamella of bone on which the polypus grows, with the view of preventing recurrence. Levret,[3] who was chiefly known as a very successful gynæcologist, seems to have been led by his experience in dealing with uterine and vaginal tumours, to turn his attention to nasal polypi, and he invented several ingenious instruments for applying and tightening ligatures. Pallucci[4] soon afterwards attempted to improve upon Levret's method, and, if his statements may be believed, he was one of the most successful operators in this branch of surgery that ever existed. Early in the present century Robertson[5] published an account, together with a drawing, of an instrument for snaring nasal polypi. The irony of the fate of inventions is indeed shown in this little instrument, for Robertson's nasal snare is acknowledged by Wilde to be the instrument on which he modelled his aural snare, whilst later on, Hilton, unaware of the original purpose of the appliance, modified Wilde's instrument so that it might be used for the nose. In modern times short treatises on nasal polypi have been published by Gruner,[6] Dzondi,[7] W. Colles,[8] Mathieu,[9] and Thudichum,[10] besides innumerable communications to the medical journals of Europe and America. The subject has also been treated of more or less fully in every general text-book on surgery, the contributions of Durham[11] and Spillman[12] being especially worthy of mention. One of the most recent works which has reference to the malady is that of Zuckerkandl,[13] whose treatise is of great value in relation to the morbid anatomy of the complaint.

---

[1] "De Morbis," lib. ii. Littré's ed. Paris, 1851, vol. vii. p. 51.
[2] "Ibid." p. 53.
[3] "De Medicinâ," lib. vi. cap. viii.
[4] "De comp. pharm. sec. locos," lib. iii. cap. iii.
[5] "Tetrabibl." ii. serm. ii. cap. lxxxix.

---

[1] Lib. vi. cap. xxv.

[2] Lib. ii. cap. xxiv. ("Chirurgie d'Abulcasis," traduite par le Dr. Lucien Leclerc). Paris, 1861, p. 93, et seq.

[3] "Le Guydon [Guy] en Francoys," par Maistre Jean Camappe. Lyon, 1538, fol. 198.

[4] "Chirurgia Guilielmi de Saliceto," in "Ars Chirurgica Guidonis Cauliaci." Venetiis, 1546, p. 308.

[5] "De tumoribus præter naturam." Appendix to his treatise "De humano fœtu." Venetiis, 1587, p. 170, et seq.

[6] "Operationes Chirurgicæ," cap. xxiv. in "Opera Chirurgica." Lugduni Batavorum, 1723, p. 438, et seq.

[7] Op. cit. See also Arantius, op. cit.

[8] "Tractatus de polypo." Bremen, 1628 cap. vii.

[9] "Prælectiones ad Institut." ad § 498.

Etiology.—The causes of nasal polypus are quite unknown. That mere chronic inflammation is not sufficient to produce it is proved by the fact, that whilst persistent catarrh is more often met with in children than in adults, mucous polypi are very rare under the age of sixteen. In adults the affection is exceedingly common, being found, according to Zuckerkandl[1] (if looked for), in every eighth or ninth autopsy. From the annexed Table (A) it will be seen that the decennium from twenty to thirty furnishes the greatest number of cases—42 per cent. Men are more liable to the affection than women, the proportion in my 200 cases being 123 men to 77 women. The youngest patient I have met was a girl aged sixteen, the youngest boy having been seventeen. Examples of much younger patients than these will be found in medical literature, but I believe that in nearly all of them the growths were malignant or fibrous. Mason[2] has, however, reported a case of a boy, whose age was only twelve, from whom he removed several large polypi. The greatest age at which a polypus commenced in my series was sixty-nine, but I have seen two other cases in which the disease originated at sixty-five and sixty-eight respectively.

---

[1] "General System of Surgery," English Transl. London, 1743, pt. ii. p. 437, et seq.

[2] "De sedibus et causis morb." Ed. sec. Patavii, 1765, epist. xiv. sec. 19-20.

[3] "Obs. sur la Cure radicale de plusieurs Polypes." Paris, 1771, 3rd ed. p. 214, et seq.

[4] "Ratio facilis atque tuta narium curandi polypos.' Viennæ, 1763.

[5] "Edinburgh Med. and Surg. Journ." 1805, vol. i. p. 410.

[6] "De polypis in cavo narium obviis." Lipsiæ, 1825.

[7] "Ergo polypi narium nequaquam extrahendi." Halæ, 1830.

[8] "Nasal Polypi."—"Dub. Quart. Journ. of Med. Sci." Nov. 1848, p. 373, et seq.

[9] "Sur les Polypes muqueux des arrière-narines." Thèse de Paris, 1875.

[10] "On Polypus in the Nose, etc." London, 1869, 3rd ed. 1877.

[11] "Holmes's System of Surgery," vol. iv.

[12] "Dict. Encyclop. des Sci. Méd." Art. "Nez."

[13] "Normale u. pathol. Anatomie der Nasenhöhle." Wien, 1882, p. 64, et seq.

TABLE A.

Showing the age and sex of 200 *patients with nasal polypus. The Table indicates as nearly as possible the age at which the growths commenced.*

Age.	Male.	Female.
16 to 20	9	7
20 to 30	51	34
30 to 40	33	13
40 to 50	18	13
50 to 60	9	10
60 to 70	3	...
	123	77

The older writers, who had somewhat vague ideas in the matter of etiology, attributed polypi to such influences as heredity, struma, syphilis, miasma, and suppressed menstruation, but these antiquated notions will not stand the rigorous analysis of the present day. Occasionally polypi seem to arise from mechanical irritation, such as may be produced by foreign bodies, but the case of Van Meekren,[3] in which the nucleus of a polypus was formed by a splinter of wood, is open to suspicion. Gerdy[1] has reported a case in which a large polypus followed a fracture of the bony septum.

---

[1] Op. cit. p. 70.

[2] "Med. Soc. Proceed." London, 1872-4, vol. i. p. 156, et seq. The date of Mr. Mason's paper is March 2, 1874. In this report the age of the patient was stated to have been twelve, whilst according to the catalogue of the Royal College of Surgeons, to whose museum the growths were presented, the age was ten.

[3] Quoted by Morgagni, loc. cit.

Symptoms.—In the earliest stage the patient suffers from increased secretion, stuffiness of the nose, and sometimes slight pain in the frontal region, together with a partial and variable occlusion of one or both nostrils. Polypi being generally pedunculated, a sensation like that caused by a foreign body moving backwards and forwards, or up and down, within the nasal cavity is sometimes experienced about this period. For the same reason these growths occasionally have a valve-like action, opposing the passage of air outwards or inwards as the case may be. They sometimes, indeed, give rise to a peculiar flapping sound, described by Dupuytren as the "bruit de drapeau." It need scarcely be pointed out, however, that in the presence of so many objective signs, this symptom is of no importance. When both the nasal passages are blocked up, the patient is of course compelled to breathe entirely through the mouth, and the usual phenomena of nasal obstruction supervene, the voice undergoing the characteristic modification, and the sense of smell being impaired or altogether lost. It is very seldom that these growths cause any bulging of the nasal parietes, and only in quite exceptional cases that the tear-duct being pressed upon epiphora results. Owing to the fact that mucous polypi possess a hygrometric property, all the symptoms are generally aggravated in damp weather. The discharge from the nose is usually watery in character, and seldom offensive, whilst epistaxis only quite occasionally occurs.

Polypi, when large, numerous, and growing from the anterior part of the cavity, can usually be seen by simply looking into the nose with the aid of a strong light, the tip of the organ being at the same time tilted upwards and backwards, but the introduction of a speculum will greatly assist the view. These growths most frequently *appear* to originate from the middle turbinated body and the parts immediately above it (see Table B), but the recent researches of Zuckerkandl (see Pathology, p. 366) show that the real origin of nasal polypi is often far deeper than clinical evidence indicates.

---

[1] "Des Polypes et de leur Traitement." Paris, 1833, pp. 4, 5.

TABLE B.

Showing the apparent situation of 259 polypi observed by the author in 200 patients, the growths having been bilateral fifty-nine times.

Middle turbinated body	104
Neighbourhood of superior turbinated body and superior meatus	77
Middle turbinated body and middle meatus	34
Middle meatus	24
Inferior turbinated body	9
Whole of outer wall of nose (except inferior meatus) ...	11
	259

Only in very rare cases is the septum the site of the affection. Bryant,[1] Leriche,[2] Clinton Wagner,[3] and Hartmann,[4] each report one example, and Zuckerkandl[5] has met with three specimens. These are the only authentic instances that I am acquainted with. Polypi, however, springing from the turbinated bodies sometimes press so firmly against the septum that it is extremely difficult to pass the finest probe between that partition and the tumour, and under such circumstances a mistake as to the origin of the polypus is likely to be made. By means of posterior rhinoscopy I have seen several cases of small symmetrical growths on the septum, but these were always either of adenoid structure, or consisted of simple hypertrophy of the mucous membrane.

Mucous polypi generally remain within the nasal cavity, but when very large they may extend forward and even project from the nostril. Sometimes they grow towards the pharynx, and can then be easily discovered by posterior rhinoscopy. Occasionally a polypus in its growth becomes attached at several different points to the contiguous walls of the nares, but this result of friction and pressure is more likely to be seen in the case of fibrous polypi than in those of myxomatous structure. In very rare instances a mucous polypus may by pressure destroy the periosteum, and one case has been reported by Colles in which the bones of the nose were separated by such a growth.[1]

---

[1] "Manual of the Practice of Surgery." 3rd ed. London, 1879. vol. ii. p. 7.

[2] "Gaz. des Hôpitaux." 1874, No. 73.

[3] "Arch. of Clin. Surg." New York, January, 1877.

[4] "Deutsch. med. Wochenschrift." 1879, Nos. 28-30.

[5] "Zur path. u. phys. Anatomie der Nasenhöhle u. ihre pneumat. Anhänge."—"Wien. med. Jahrb." 1879. See also "Anatomie der Nasenhöhle," p. 84. It appears doubtful from the description whether all Zuckerkandl's cases were examples of true polypi.

Mucous polypi are generally multiple, and according to my experience (see Table B) occur on both sides in nearly 30 per cent. Globular in shape at first, they most frequently hang loosely from the nasal wall, being suspended by a narrow pedicle. It is thus that gravitation acting on their semi-fluid contents soon determines their characteristic tear-shaped outline. They do not, however, always retain this form, for, as Gruner remarks, the larger the size to which they attain the more they recede from their pyriform shape, as they are easily moulded by the unyielding structures which after a time confine them on every side.

The views which have just been expressed are, however, opposed to the recent anatomical observations of Zuckerkandl,[2] who maintains that there are two kinds of polypus, viz., those of oval form with narrow pedicle, and those of round shape with broad base, the former growing from sharp edges, the latter from flat surfaces. Zuckerkandl maintains that the globular tumours are never converted into the oval, but that each kind possesses its peculiar shape from the time of its first appearance. Polypi vary in size from a tare to a chestnut, but when requiring treatment are most frequently between a currant and a grape in size. I have met with one exceptional case, however, in which the growth, when stretched out, measured five inches in length, and was seven-eighths of an inch in diameter at its base (Fig. 78). I removed the polypus from a gentleman aged twenty-two, in the presence of Dr. Snell, of Mile End. No recurrence had taken place nine years later. A more remarkable example still has been reported by Stoerk,[3] in which a polypus springing from within the posterior nares reached down to the larynx. There are often one or two polypi about the size of a small grape or currant, and a great number of others which are scarcely visible. Their colour is generally dull yellow, but occasionally they are greyish-white or pink. Their surface is smooth and shining, and when touched lightly with a probe they dimple through their elasticity, returning at once to their former shape. When a strong light is directed on the polypus, it generally has a somewhat translucent appearance. Mucous polypi are devoid of sensibility, the pain which is felt on their forcible removal being due to their connection with the mucous membrane.

---

[1] "Dub. Quart. Journ. Med. Sci." No. 12. November, 1848, p. 374.

[2] Op. cit. p. 78, et seq.

[3] "Krankheiten des Kehlkopfes." Stuttgart, 1880, p. 105.

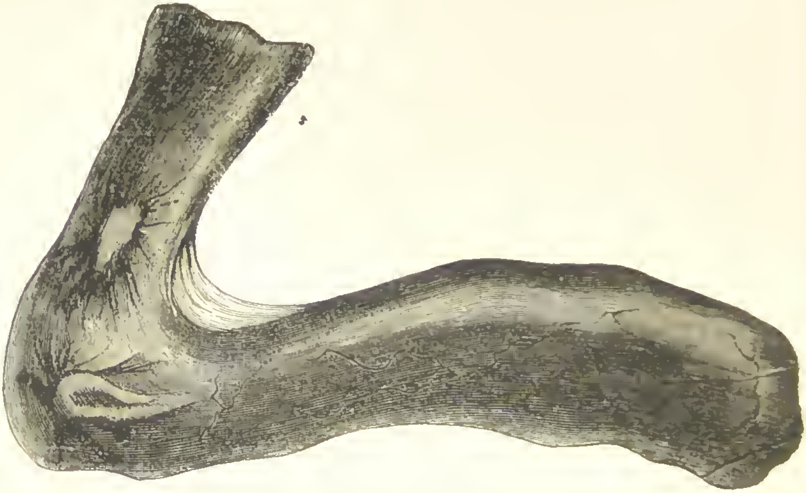

FIG. 78.—POLYPUS REMOVED BY THE AUTHOR.

The ordinary symptoms attending the presence of a polypus in the nose having been described, it is necessary to add a few remarks on a much more serious class of troubles to which attention has been called in recent years. Soon after Voltolini[1] had recorded an instance in which asthma resulted from the presence of a polypus in the nasal passages, similar cases were reported by Hänisch,[2] Porter,[3] Daly,[4] Todd,[5] Spencer,[6] Mullhall,[7] Joal,[8] and Jacquin,[9] and the reflex causation of asthma from nasal polypi has been discussed by Schäffer,[10] Fränkel,[11] and Bresgen.[12] The whole subject of the reflex effects of nasal obstruction, and especially of polypi, has been recently studied with great ability by Hack,[1] who considers that nightmare, cough, hemicrania, brow-ague, certain vasomotor phenomena shown by quasi-erysipelatous symptoms (in which there is temporary limited redness of the cheeks), attacks of giddiness, epilepsy, rhinorrhœa, and hay fever often owe their origin to polypus, or tumefaction of the nasal mucous membrane. Hack gives many illustrative cases in which the various complaints referred to were cured by surgical operations within the nose, and it may be added that his etiological views have already received independent support from other observers. Löwe[2] has reported a case in which epileptic fits, which had before been of almost daily occurrence, suddenly ceased when the nasal passage was made clear. The obstruction had been produced by a polypus in the left nostril, accompanied by hypertrophy of the mucous membrane covering the lower turbinated body, and adenoid vegetations about the posterior nares. When these sources of irritation had been removed the fits only came on under the influence of some extraordinary mental disturbance.

---

[1] "Die Anwendung d. Galvanokaustik." Wien. 1872, p. 246, 4 Aufl.

[2] "Berlin. klin. Wochenschrift." 1874, No. 40.

[3] "New York Med. Record," October 11, 1879; also "Arch. of Laryngology," 1882, vol. iii. No. 2.

[4] "Arch. of Laryngology," vol. ii.

[5] "Trans. Missouri State Med. Assoc." 1881.

[6] "Quoted by Todd, ibid.

[7] "St. Louis Med. Surg. Journ." Feb. 1882.

[8] "Gaz. des Hôpitaux." 1882, p. 442, et seq.

[9] Ibid. 1882, p. 507.

[10] "Deutsche med. Wochenschrift." 1879, Nos. 32 and 33.

[11] "Berlin. klin. Wochenschrift." 1881, Nos. 16 and 17.

[12] "Volkmann's klin. Vorträge." 1882, No. 216.

In connection with this last case, I may state that I have lately treated (with Dr. Hughlings Jackson and Dr. Sillifant, of Barnsbury) a gentleman, aged fifty-five, who had suffered for some months from attacks of extreme restlessness, together with such severe dyspnœa that he was unable to lie down at night. He also had violent paroxysms of facial spasm, and on one or two occasions epileptiform seizures, during which he was unconscious for twenty minutes or half an hour. There was a mass of polypi in the upper part of the nasal passages on both sides. These growths having been almost completely removed the paroxysms of dyspnœa entirely ceased, and the other nervous symptoms gradually disappeared. Elsberg[3] has also met with cases of chorea, epilepsy, supra-orbital headache, and hemicrania, due to reflex irritation within the nose. Seiler[4] has reported two cases, and refers to two others in which he believes that thickening of the anterior part of the inferior turbinated bodies was the cause of a troublesome cough. The cases described are not very conclusive, but in both of them treatment of the nose relieved the laryngeal symptom. John Mackenzie[1] has found cough so frequently a reflex symptom of nasal disease that he has ceased to regard it as a curiosity. He is of opinion that the posterior portion of the middle and inferior turbinated bodies with the corresponding part of the septum are the special seat of reflex irritability. Hack,[2] on the other hand, concludes from his own observations, that reflex phenomena, such as cough and sneezing, may be produced by irritation of any part of the lining membrane of the nose, but that such manifestations do not take place *until the anterior part of the lower turbinated body has first become turgid.*

---

[1] "Wien med. Wochenschrift." 1882, Nos. 49, 50, 51; and 1883, No. 1, et seq.

[2] "Allgemein. med. Central Zeitung." 1882, No. 76.

[3] "Philadelphia Med. News." May 26, 1883, p. 601.

[4] "Arch. of Laryngology." 1882, vol. iii. p. 240, et seq.

The following examples of asthma dependent on growths in the nares occurred in my own practice :—

One of these cases was that of a lady, aged sixty-three, who consulted me in March, 1874. She had suffered for three years from severe attacks of asthma, which came on nearly every night. Various remedies had been used with partial success, but the asthma was entirely cured by the removal of two large polypi—one from each middle turbinated body.

In a second case the patient was a gentleman, aged forty-seven, whom I first saw in July, 1876. During the previous five years he had suffered occasionally from asthma, the paroxysms, as in the last case, always occurring at night. The removal of a quantity of small growths from the neighbourhood of the superior turbinated body on the right side entirely relieved the patient of his asthmatic attacks, which, however, returned, after an interval of four months. The recurrence of the dyspnœa was found to be coincident with a fresh development of polypi, and on their removal the symptoms again passed off.

In a third patient, recently sent to me by Dr. Hughes of Llanberis, very severe attacks of asthma appeared to have been caused by the presence of polypi in the nose : violent paroxysms were also produced by the insufflation of tannic acid.

Daly[3] has recently maintained that the disposition to hay fever must be sought for in chronic hypertrophy of the mucous membrane of the nose, and this theory has been adopted by Roe,[4] of Albany. My own experience, however, does not confirm the view.

Whilst fully admitting that many reflex phenomena may arise from disease within the nose, I must caution the younger specialists that the various complaints referred to as resulting from nasal disease are much more frequently due to other conditions, and that every other possible cause must be eliminated before the nose is incriminated.

---

[1] "Amer. Journ. Med. Sci." July, 1883, p. 106, et seq.

[2] Loc. cit. p. 36.

[3] "Arch. of Laryngology." 1882, vol. iii. p. 157, et seq.

[4] "New York Med. Journ." May 12, 1883, p. 509, et seq.

Diagnosis.—Although in most cases it is easy to diagnose nasal polypi, yet mistakes do occasionally occur. The gelatinous softness, elasticity, mobility and pale semi-transparent appearance of these tumours are, however, very characteristic features, and serve to distinguish them from most other swellings. Fibrous, sarcomatous, and cancerous growths are usually much harder, bleed easily on being touched, cause considerable pain, and often produce great disfigurement. Cartilaginous or osseous tumours are so hard that their real nature is at once evident. Deviation of the septum has occasionally been mistaken for a polypus; but when this condition exists there is an irregular projection into one nasal passage and a corresponding depression in the other, showing the character of the affection. Chronic abscess of the septum has frequently been mistaken for polypus, but it differs almost diametrically from that complaint. For whilst a polypus hangs almost invariably from the outer wall of the nasal cavity by a pedicle, an abscess is situated on the septum and has a broad origin. Moreover, in cases of abscess there is, in the vast majority of instances, a similar swelling in the other nostril, the bases of the tumours accurately corresponding with each other on the two sides of the septum. Blood tumours present the same general characters as abscesses, except that they are of dark purple colour. In both cases there is usually a history of more or less recent injury to the nose. In any doubtful instance, however, puncture of one of the tumours will solve the question as to its nature.

The condition most likely to be mistaken for polypus is thickening of the mucous membrane covering the inferior turbinated bones. This mistake is frequently made by practitioners, owing to the fact that in systematic surgical works the diagnosis between these conditions has not hitherto been pointed out. Polypi, however, though often bilateral, are seldom so symmetrical as is the thickening of the turbinated bodies, and whilst the colour of the former is pale yellow or pink, that of the hypertrophied turbinated bodies is either bright, or dark, red. Again, though the thickened mucous membrane pits a little under the probe, the entire body does not move as in the case of a polypus. It must not be forgotten, however, that polypus and hypertrophy often coexist. A foreign body might possibly be mistaken for a polypus, but the inflammation and fetid discharge from the nose which accompany it will make the practitioner suspect something more than a mucous growth. Amongst rare conditions, which need only be referred to as curiosities, may be mentioned mucous distension of the ethmoidal cells and hernia of the brain. The museum of St. Thomas's Hospital contains two examples of the former affection, in which the appearance during life must have closely resembled mucous polypi.[1] As Spencer Watson[2] observes with regard to these specimens, the hard wall of the projecting body and the escape of the pent-up mucus on puncture would determine their nature. A curious case was reported by Cruveilhier,[3] in which a hernia of the dura mater and brain through the cribriform plate of the ethmoid bone, exactly resembling a polypus, was discovered at a post-mortem examination. Such a tumour, however, would move rhythmically with the respiration and pulsate with the systole of the heart; moreover, in its development cerebral symptoms would be almost sure to occur.

Pathology.—The external investment of these polypi is usually composed of ciliated epithelium, and beneath this outer layer there are generally a few dilated capillaries but no nerves. The bulk of the growth is made up of embryonic connective tissue, consisting of a hyaline gelatinous material through which more resisting cellular trabeculæ pass in various directions. The gelatinous substance is very rich in mucin, and contains in the early state round and oval cells, which at a later period become elongated, fusiform or stellate, and for the most part nucleated and granular. According to Cornil and Ranvier,[4] the latter kind of cell is most common. The consistency of the growth depends on the greater or less degree in which the connective stroma or the mucous substance predominates in its structure. Here and there small cavities full of colourless stringy fluid may be met with. Some observers regard such growths as true cysts, but Follin and Duplay[5] consider that the absence of any distinct wall shows that these formations are not really of cystic character. Zuckerkandl,[6] however, maintains that he has occasionally found cysts in the neighbourhood of nasal polypi. They are, he says, of white colour, and generally the size of a bean, but he once saw a cyst as large as a hazel-nut growing from the anterior part of the lower turbinated body, and containing a honey-like fluid. Sometimes nasal polypi contain glandulæ, but the growths themselves never appear to be of glandular origin. Hypertrophy of the mucous membrane is very frequently associated with the presence of polypi, whilst, on the other hand, these growths often give rise to atrophy of the soft structures.

---

[1] "Museum Catalogue." Sec. i. Nos. 14 and 15.

[2] "Diseases of the Nose." London, 1876, p. 73.

[3] "Anatom. Pathol. du Corps Humain." Paris, 1835-42, t. ii. livraison xxvi. pp. 5, 6.

[4] "Manuel d'Histol. Path." Paris, 1869, p. 145.

[5] "Traité Élém. de Path. externe." Paris, 1877, t. iii. p. 812.

[6] Op. cit. p. 100.

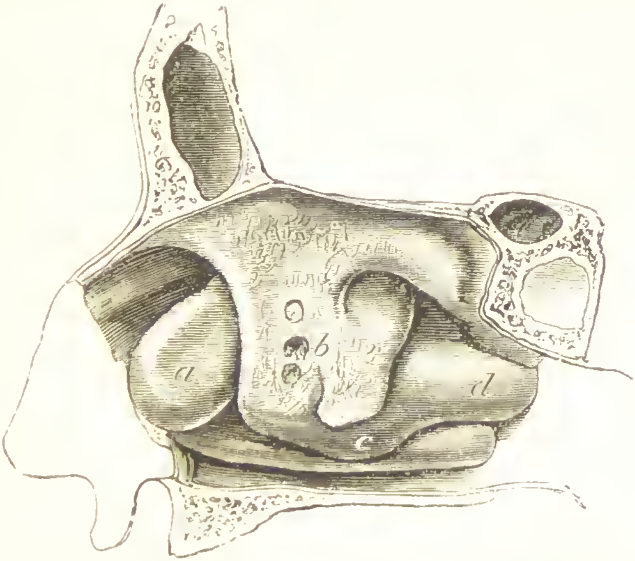

FIG. 79.—FROM SPECIMEN NO. 2201A IN THE MUSEUM OF THE ROYAL COLLEGE OF SURGEONS.

a, polypus hanging from the middle meatus; *b*, apron-like flap hanging from the vault of the nose and upper turbinated body, and partly covering *d*, the middle turbinated body, which is greatly thickened; *c*, portion of middle, projecting over the lower turbinated body. Near *b* are three small abrasions, possibly caused by the pressure of the inner wall.

The exact site of origin of nasal polypi is a matter of perhaps even more importance than their minute structure, and valuable information on this subject may be obtained from Zuckerkandl,[1] who has recently published the post-mortem reports of thirty-nine cases of polypus and polypoid thickening of the mucous membrane of the nose. The great value of these observations depends on their having been made after the gradual removal of the various bony parts which interfered with a view of the deep origin of the growths. In a few of Zuckerkandl's cases, the disease was nothing more than simple hypertrophy, one or two others were of doubtful character, one was a papilloma, in two instances the growth was really in the naso-pharynx, whilst in three, polypoid excrescences grew from the septum. In several instances, however, the polypi were multiple, so that the exact seat of attachment of forty-two[1] distinct growths could be determined. Fourteen grew from the edges of the *hiatus semilunaris*, three from the edges of the *hiatus* and the *infundibulum*, two entirely from within the *infundibulum*, one from the *ostium frontale*, one from the *ostium sphenoidale*, one from the *ostium ethmoidale*, two from the *antrum*, ten from the *middle meatus*, three from the *upper meatus*, four from the *middle*, and one from the *upper turbinated* body.

---

[1] Op. cit. p. 64, et seq.

Prognosis.—Mucous polypi cause great inconvenience and annoyance, but are very seldom attended with any serious risk, certain extremely rare reflex phenomena already described being perhaps the most alarming features. True polypus so rarely causes any disfigurement that this matter may be dismissed from consideration. Even after the growth has apparently been completely removed, however, there is a great probability of the patient being again troubled with the complaint. This is partly owing to the fact that the real origin often cannot be reached, and partly to the circumstance that very small polypi no doubt often exist which are not visible at the time when the larger growths are removed. When relieved, however, from pressure, the minute excrescences at once commence to grow.

Spontaneous expulsion[2] of a polypus sometimes takes place, and I have seen several cases where this has occurred. In my experience, however, it has only happened when several polypi were crowded together, and has therefore not affected the prospects of cure. Spontaneous *absorption* is said to have occurred in one case;[3] but as the polypus (?) gave rise to most intense headache, whilst it grew with extreme rapidity and finally sloughed away, it can scarcely be classed with the disease now under consideration.

---

[1] Op. cit. pp. 64 to 84. In reality the actual number of separate growths was more than this, for in some cases where a single site is given there were "several" polypi.

[2] Michel: Op. cit. p. 55.

[3] Maddock: "Lancet." 1836-37, vol. ii. pp. 590, 591.

Treatment.—Medical remedies have been used from a very early period with the view of drying up nasal polypi, a method of cure which the gelatinous nature of the growth naturally suggested. Galen advised the use of alum and pomegranate juice. At a later period chloride of antimony and sulphuric acid were much employed with the same object, and in modern times various astringents and caustics have been recommended. In 1821 Primus, of Babenhausen,[1] reported two successful cases from the use of the saffronized tincture of opium of the Prussian Pharmacopœia. According to that surgeon, the polypus, if painted with this solution several times a day for about a week or ten days, under favourable circumstances shrivels up and becomes detached. Bryant[2] strongly recommends the application of finely powdered tannin by means of his nasal insufflator (Fig. 37, p. 256), but though in the case of nervous patients who have objected to an operation I have tried this remedy, I cannot say I have ever found it do any good. Nitrate of silver was successfully used by Nélaton.[3]

Reeder,[4] of Illinois, is stated to have employed strong injections of perchloride of iron with good effect in two cases. Erichsen[5] mentions that he has seen one case in which injections of chloride of zinc caused the separation by sloughing of a polypus so large that it blocked up the nostril completely and descended into the pharynx. Frédéricq[6] claims to have obtained excellent results from the application of a saturated watery solution of bichromate of potash to the polypus. He states that it produces some inflammation, which is followed by absorption of the growth. The application may have to be repeated once or twice, but Frédéricq affirms that he has cured several cases in this manner within five or six days, that he has seldom seen any recurrence, and that he has never known any ill effect follow the use of the bichromate. Donaldson,[7] of Baltimore, has found great benefit from chromic acid. The mucous membrane is painted with a solution of lead, and a paste of chromic acid is applied to the polypus by burying a glass rod smeared with the agent in the substance of the tumour. The mass dries up, and can then be easily removed with forceps at the same sitting.

---

[1] "Hartenkeil's Medico-Chir. Zeitung." Salzburg, 1821, p. 56.

[2] "Lancet," February," 1867, p. 235.

[3] "Pathologie Chirurgicale." Paris, 1874, 2me ed. t. iii. p. 748.

[4] Quoted by Gross: "System of Surgery." Philadelphia, 1882, 6th ed. vol. ii. p. 290.

[5] "Science and Art of Surgery." 6th ed. vol. ii. p. 320.

[6] "Mémoire présentée à la Société de Médecine de Gand." 1862. Quoted by Spillmann, "Dict. Encyclop." t. xiii. p. 88.

[7] "Philadelphia Medical News." May 26, 1883, p. 597.

The general experience, however, is that astringents offer so slender a chance of doing any good, that it is hardly worth while to make a trial of them. By the application of strong caustics or escharotics, no doubt nearly all nasal myxomata may be destroyed; but the cure is very tedious and painful, and, moreover, it is difficult to limit the action of the agent to the tumour. Electrolytic treatment would no doubt sometimes succeed in destroying these growths, but its operation would probably be extremely tedious.

Surgical Measures.—There are three principal methods of removing or destroying nasal polypi, viz., evulsion, abscission, and electric cautery.

Evulsion with forceps is the oldest and still the most generally practised method, and it must be admitted that it is a very rapid way of removing polypi, but the ease with which it can usually be carried out, led practitioners in former times to suppose that the proceeding was equally applicable to all intra-nasal growths, wherever situated, and whatever the nature of their attachments. Acting on such premises, surgeons of the last century increased the size and leverage of their forceps, and adapted them by suitable curves for introduction, either by the nostril or through the pharynx, as if no more consideration were necessary than to seize every nasal tumour with tenacity and wrench it away with violence. Tearing away of the septum, and even great injury to the ethmoid and nasal bones, not unfrequently resulted from such vigorous surgery, and it is not surprising that this mode of treatment, after a time, met with opposition.

But although the practice has since then been placed on a rational and scientific basis, attempts have been recently made to revive the prejudice against it which was once so well founded. Whilst usually practised by general surgeons, and still almost universally recommended in our standard text-books on surgery,[1] some leading specialists of the day condemn it in the strongest terms. Voltolini[2] says: "Of late years, the forceps has superseded all other instruments, and as the result of its employment, severe mutilations are frequently seen in the nose. Many distinguished surgeons admit that evulsion is one of the most brutal and disagreeable operations. . . . The forceps, blindly introduced, tears away or injures everything that comes in the way, whether it is healthy or diseased, soft or hard (turbinated bones and nasal septum)." He adds that, "In operations with forceps, the greatest force has to be used in some cases; in fact one has to pull, as it were, 'for life,' in order to get away the polypus." Michel[1] states that, "as the result of operations by others with forceps, he has seen luxation of the cartilaginous septum, fracture of the bones, removal of portions of the turbinated bones, circumstances which increase the sufferings of the patients, and render the operation quite horrible." Zaufal,[2] in recommending the snare, says that he hopes "to render utterly impossible in the future the obsolete, barbarous forceps-operation so unworthy of modern surgery."

---

[1] Erichsen, Gant, Bryant, Fergusson, Gross, Hueter, Lücke, Albert, and Duplay.

[2] "Die Anwendung der Galvanocaustik," p. 243.

More recently, Lémeré[3] has ransacked French medical literature in order to bring together all the cases he could find, in which bad results have followed evulsion. He divides them into immediate and remote. Amongst the immediate dangers, however, he only mentions hæmorrhage, and, as an illustration, adduces one case in which Gosselin had to plug the nares, and another case (from Gerdy) in which the hæmorrhage had to be stopped in the same way. In the latter case the patient died, but as the tumour was clearly shown to be a fibroma it does not bear on the question of evulsion of mucous polypi. Amongst the remote dangers he adduces the following:—(1) Obliteration of the nasal duct, (2) injury to the antrum or frontal sinuses, (3) injury to veins, (4) injury to the bones of the nose and skull, and (5) rapid exuberant recurrence. Under the first head, only one case from Péan is given, which was ultimately cured. In illustration of the injury to the frontal sinuses and antrum, he adduces a case (also from Péan) in which a man suffered for twelve years from a deep-seated tumour on the cheek, which the *patient stated* commenced after the evulsion of a polypus. An exploratory puncture gave issue to a syrupy liquid, amber in colour, and containing cholesterine crystals. As an example of injury to the frontal sinus, Lémeré reports two cases; one (from Broca), in which an abscess, which formed in the frontal sinus a few weeks after evulsion of a polypus from the nose, was cured in three months; and another case (from Demarquay) in which the patient, aged seventy-four, was attacked with abscess of the frontal sinus after a polypus had been torn away. The bone was trephined and the patient cured. As an instance of injury to the veins, he brings forward the last case again, recurrence having taken place the following year. Evulsion again gave rise to erysipelas, and six months afterwards the operation was again performed with similar results: three months later evulsion was repeated, and the stump treated with nitrate of silver. This was followed by intense pain on the right side of the head, and violent inflammation of the pituitary membrane. Twelve days afterwards, the right lower eyelid became greatly depressed, the right eye fixed, with its pupil dilated, and insensible to light. Death occurred a fortnight after the operation. At the post-mortem examination, congestion of the meninges was found at the base of the brain on the right side. The body of the sphenoid was friable, and pus oozed through the *sella turcica*. The cavernous sinus was bathed in pus, and there was purulent infiltration of the right pituitary membrane. The sphenoidal, ethmoidal, and maxillary sinuses were full of pus. The case does not exactly seem to have been one of venous infection, but rather an extension of inflammation from the nose to the sinuses and the brain. It is clear that the repeated operations ought not to have been undertaken, as the patient was an old man, exceedingly prone to erysipelas; but as he was a medical practitioner, he probably insisted on measures which were clearly unsuitable, and the case has no bearing on the general merits of evulsion. In illustration of injury to the bones of the skull, Lémeré mentions a case (from Tillaux) in which a patient applied for relief on account of a constant flow of liquid from the nose, which, on examination by Robin and Méhu, was found to be pure cerebro-spinal fluid. Evulsion had been previously practised on this patient on two occasions, and Tillaux considered that, in one of the operations, the cribriform plate of the ethmoid bone must have been broken through by the forceps. The only example which Lémeré gives of exuberant recurrence was clearly a case of cancer.

---

[1] "Die Krankheiten der Nasenhöhle." Berlin, 1876, p. 57.

[2] "Die Allgemeine Verwendbarkeit der kalten Drahtschlinge." 1878. See preface.

[3] "Sur les Accidents consécutifs à l'Arrachement des Polypes des Fosses nasales." Paris, 1877.

From the above cases, collected from a treatise professedly written to exemplify the dangers of evulsion, it will be seen how difficult it is to bring forward any tangible evidence against the operation. Albert,[1] in his recent work, has defended this method against the attacks of specialists The following are some of his remarks on the subject :—"In late years, this method (the operation by forceps) has been condemned as brutal, painful, and inefficient. There is no doubt that it can be performed brutally by rough or clumsy hands; but the conservative surgeon does not grope blindly in the nasal cavity; on the contrary, he places the patient in a proper position, makes use of a nasal speculum, and, carefully selecting forceps suitable as regards the size and situation of the polypus, he seizes it by the pedicle, and extracts it by gentle rotatory movements." He adds, that "the hostility to the old universally-practised method (evulsion by forceps) is merely the outcome of the elaborate methods used by the specialist with an object which it is easy to understand." Specialists might perhaps retort that the hostility of some surgeons to new and improved methods of cure, which they have themselves failed to master, has a motive which it is equally easy to understand. But such amenities are better avoided in scientific discussions.

It is curious that the principal objection urged by Voltolini, Michel, and others, against the practice of evulsion with forceps, viz., that a portion of one of the turbinated bones is often torn away, is considered a recommendation by the advocates of the forceps. It has already been shown (see History) that in the seventeenth century, Valsalva,[2] for the purpose of preventing the recurrence of the growth, introduced the practice of removing, together with the polypus, the lamella of bone from which it springs; and in our own time, the two leading conservative surgeons, Fergusson[3] and Pirogoff,[4] have advocated the same treatment. I may add, that I have myself frequently removed portions of the turbinated bones without seeing any evil result follow; and it appears to me extremely doubtful whether any bad effect could be produced by the *partial* removal of *one* of these bones.

---

[1] "Lehrbuch der Chirurgie." Wien u. Leipzig, 1881, Bd. i. p. 305.

[2] Morgagni: "De sedibus et causis morb." Patavii, 1765, ep. xiv, sec. 19.

[3] Although there is no mention of it in his published writings, I often heard this great surgeon remark, that one could never feel sure of the complete removal of a polypus, unless a portion of the bone was taken away with it.

[4] "Klinische Chirurgie," 3tes Heft. Leipzig, 1854, p. 73.

It is no doubt perfectly true that air breathed through the nose reaches the lungs at a higher temperature than when it is inspired through the mouth, and that this is due, in some measure, to the peculiar vascular structure of the turbinated bodies. The interesting experiments of Gréhant,[1] by which the temperature of air expired by the lungs previously inspired through the nose, was compared with that expired after previous oral inspiration, first proved this to be the case. The following are the details of the experiments: A small thermometer was enclosed in a glass tube, each end of which was stopped with a cork perforated so as to allow free passage to a current of air. This apparatus was then placed inside a second tube, the space between the two being filled up with cotton wool. The outer tube having next been introduced into the mouth, with the bulb of the thermometer at a distance of from one to two centimetres from the lips, air was inspired through the nose, the aperture in the outer tube being closed meanwhile with the tongue: finally expiration was performed through the apparatus containing the thermometer. Under these circumstances, the temperature of the atmosphere being 71·6° F., that of the air expired through the tube was found to be 95·7°. On the other hand, when air was drawn in through the mouth (the tube being closed with the tongue, as before), the temperature of the air expired through the tube was only 93·5°. The temperature of the expired air in these experiments was found to vary, being lower at the commencement of the act of expiration than at its conclusion; the temperature given by Gréhant, therefore, was a mean of that observed at three periods, viz., the commencement, the middle, and the conclusion of expiration. This feature, as well as some other points, not appearing quite satisfactory, I thought it desirable to repeat the experiment in a slightly modified form, and in the following investigations my assistant, Dr. George F. Hawley (U.S.A.), afforded me material help. Instead of expiration being made directly on the thermometer, I employed an india-rubber bag of the capacity of one gallon. Into the further end of the bag a thermometer was fitted, whilst to its proximal extremity a piece of tubing, which served as a mouthpiece, was attached. The temperature of the expired air, when previously inspired through the nose, was now compared with the expired air after oral inspiration. With the thermometer set at 70° F., the expired air after nasal inspiration, as the result of a large number of experiments, showed an average temperature of 75·1°, whilst the average temperature after oral inspiration was only 73·6°, or, in other words, nasal inspiration raised the temperature a degree and half higher than oral inspiration.

Such experiments are, however, always open to objection, as they do not show the actual difference in the air after inspiration through the nose and mouth respectively, but the only difference in the expired air after the two different modes of inspiration. It was thought desirable, therefore, to make more direct experiments. A thermometer was accordingly supported in such a way that it could be worn in the mouth with the bulb in the pharnyx on one side between the uvula and the pharyngeal wall. The support of the instrument consisted of a wooden bar, with a hole in its centre, just big enough to admit the introduction of the thermometer, and retain it in position ; it was held between the teeth, like a horse's bit, in such a way that the subject's lips did not touch the thermometer. When the instrument was placed in the pharynx, and allowed to attain to a temperature of 90° F., it was found as the result of a large number of experiments that gentle[1] nasal inspiration reduced the temperature only half a degree, whilst gentle oral inspiration lowered the temperature a degree and a half, showing a superiority of one degree in the heating power of the nasal channels as compared with the mouth.

---

[1] "Recherches physiques sur la Respiration de l'Homme." Thèse de Paris No. 161. 1864, p. 30, et seq.

It is possible that if these experiments had been carried out in an atmosphere at a lower temperature the influence of nasal inspiration would have been more marked, but, after all, the experiments only show that when the air reaches the lungs after passing through the comparatively long and narrow passages of the nose, it arrives in the pharynx at a higher temperature than when it passes directly through the mouth.

---

[1] Forcible inspiration produced such variable results that the experiments were unsatisfactory.

The real use of nasal inspiration, however, consists probably more in the protection it affords against the entrance of minute foreign bodies rather than in its thermic effects on the inspired air. The advantage of inspiring through the nose, in fact, lies in the exclusion of the irritating matters floating in the air, which, if they elude the vibrissæ, are likely to become deposited in the nasal passages, and are thus prevented entering the lungs.[1] The bad effect of oral respira-

---

[1] Catlin ("The Breath of Life." London, 1861, p. 39), the great apostle of nose-breathing, has carried his enthusiasm somewhat too far, and has confused cause and effect in a most amusing way. Thus, in the case of those people who cannot close the mouth, he asserts that "the derangement and deformity of the teeth" proves the "long practice of the baneful habit" (mouth-breathing), and he adds "that the mouth of the hyæna and donkey are agreeable, and even handsome, by the side of such people." The expression of persons who cannot close the mouth is not always prepossessing, but it seems a little hard that they should be compared unfavourably with the donkey, and even the hyæna. It is scarcely necessary to point out that the deformity of the teeth referred to does not *result* from mouth-breathing, but that in certain cases the direction of the teeth prevents the patient closing the mouth, and that he is thus naturally inclined to use the mouth in breathing. The irregularity of the teeth commences at the second dentition, through the abnormal development and projection forward of the intermaxillary bone. It is most frequently a hereditary peculiarity, and is in no possible way caused by breathing through the mouth.

Catlin also states that amongst the American Indians deafness, tion indeed is not seen in the chest but in the pharynx, where the mucous membrane becomes dried by exposure to the air, and irritated by particles of dust floating in the atmosphere.

The thermic influence of nasal inspiration is probably due to the passage of the air through a narrow canal lined by a thin mucous membrane abundantly supplied with vessels, rather than to the special structure of the turbinated bodies. The peculiar erectile structure of these parts, moreover, is only seen to perfection in the *inferior* turbinated body, and it is not this, but the *middle* body which sometimes requires partial removal. But if, taking into consideration the peculiar histological character of the turbinated bodies, their physiological importance be conceded, it does not follow that the ablation of *a portion of one* of the bones would be attended with any unfavourable results. I go further, however, and do not hesitate to assert that there are some polypi, which, from their anatomical situation, cannot be extirpated unless a portion of a turbinated bone is also taken away. A mere glance at the annexed sketches (Figs. 80 and 81) renders it evident that a polypus springing from any of the localities marked × could not be taken away except by previous or simultaneous removal of a lamella of bone, especially when the position of the nares in relation to those localities is taken into consideration. This view is, moreover, amply confirmed by the recent observations of Zuckerkandl (p. 366) as regards the origin of polypi. The well-known disposition to recurrence of these growths, which has already been pointed out (see Prognosis), is one of the great causes of difficulty in dealing with them. Now there cannot be the least doubt that in some cases the ablation of the lamella of bone from which the polypus springs is the most certain method of preventing any fresh development of the growth, whilst in others its origin can only be reached by first taking away a portion of bone. In conclusion, it may be confidently asserted that if any slight trouble should arise in consequence of the removal of a piece of bone, this will at any rate be far less than the annoyance caused by a mass blocking up the nose, and perhaps requiring repeated operations for its eradication.

dumbness, spinal curvature, and death from teething and diseases of the respiratory passages are almost unknown; and he attributes this exemption to the habit of breathing through the nose, so universally practised by them!

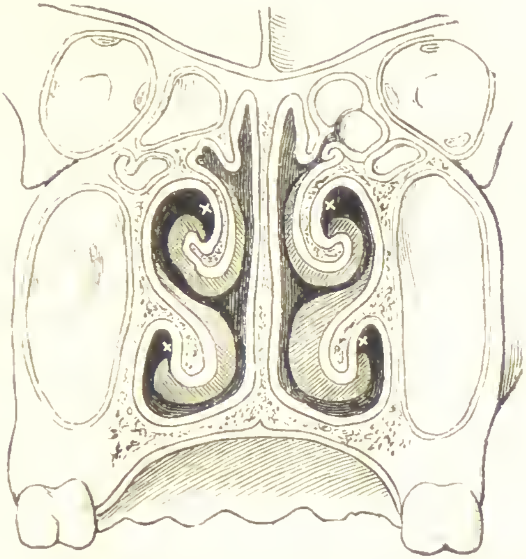

FIG. 80.—TRANSVERSE VERTICAL SECTION THROUGH THE NASAL FOSSÆ AT A POINT BEHIND THE FIRST MOLAR TEETH (AFTER HIRSCHFELD). *The × at four different points shows the supposed origin of polypi.*

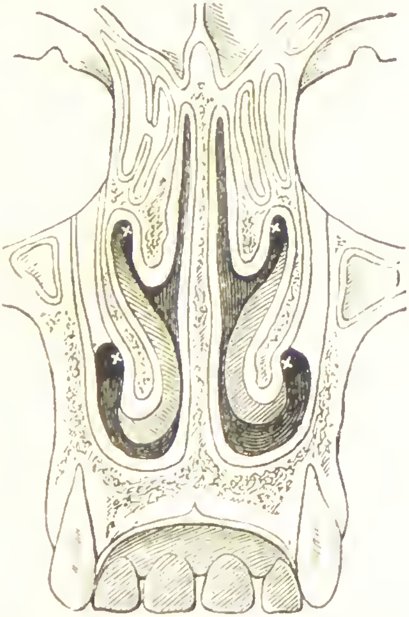

FIG. 81.—TRANSVERSE VERTICAL SECTION OF THE NASAL FOSSÆ IN THE PLANE OF THE BICUSPID TEETH (AFTER HIRSCHFELD). *The × at four different points indicates the supposed point of origin of polypi.*

The subject of the removal of a portion of one of the turbinated bones has been treated here because this ablation is often *accidentally* effected in evulsion, but it must not be supposed that it is an essential feature in the operation. It is, indeed, only in quite a small proportion of cases that it occurs. When it is thought desirable to remove a portion of bone it is certainly better to cut it away (see Abscission) than to practise evulsion, as by the latter operation the quantity of bone which comes away cannot be controlled.

The great advantage of evulsion is not only the *facility* with which the treatment can be carried out, but the *rapidity with which relief* can always be obtained. More growths can generally be taken away at a single sitting than can be got rid of either with the snare or by electric cautery. Although, as a rule, celerity is not a chief consideration in treatment, yet cases every now and then occur in which time is a most important element, and this point should certainly be thought of in judging of the relative merits of surgical methods, when it does not involve any risk to life, health, or the integrity of any important function. The operation of evulsion holds an intermediate position, neither deserving the extreme abuse it has received from specialists, nor the high encomiums of general surgeons. In my opinion it is altogether an inferior method to removal by electric cautery, and I feel convinced that no practitioner who has had a large experience in operating with suitably constructed electrical apparatus *would ever allow evulsion to be performed on himself*. Nevertheless, as the number of surgeons who have the opportunity of acquiring skill in using electro-cautery will always be limited, it is necessary to fall back on less perfect modes of treatment; and where a more refined method cannot be employed evulsion may be resorted to with a good prospect of favourable results. At the same time I think it right to state that though I formerly practised evulsion extensively I now seldom employ it, having found that electric cautery gives less pain to the patient, and causes no hæmorrhage. Abscission with cutting forceps is also, to my mind, a preferable operation.

In practising evulsion, the interior of the nose is to be first thoroughly exposed (see "The Application of Anterior Rhinoscopy," p. 243), the growth is then seized, the blades of the forceps firmly compressed, and lastly, the handle of the instrument moved up and down, and slightly twisted to one side. The value of this process was first pointed out by Dzondi, who recommended that the polypus should be drawn forwards with one pair of light forceps, whilst with another pair its root was bruised as close as possible to its attachment. It is seldom, however, that there is room for using two pairs of forceps at the same time in so confined a space. An ingenious modification of the common forceps (Fig. 54, p. 268) has been made by George Stoker, by which the tumour can be really twisted off instead of being torn away. Where the mass is large, and situated far back, it is best to use the common polypus-forceps (Fig. 49, p. 265). The blades of this instrument should, after careful determination of the site of the growth, be introduced into the nose, when by passing the index finger of the left hand round the uvula into the posterior nares, the polypus can easily be seized. In these cases the administration of nitrous oxide gas greatly facilitates the operation.

Evulsion by means of a sponge was first recommended by Hippocrates, and the mode of carrying it out has already been described (see History). In modern times the practice has been revived by McRuer,[1] who "succeeded in at least ten cases in bringing away all the adventitious growths." Voltolini[2] has also quite lately reported a case successfully treated by this method.

When the growth is situated far back it can sometimes be more easily reached through the pharynx than through the anterior orifice of the nose. In a case in which Morand[3] had failed to get away the mass of a polypus with forceps, he was able to remove it through the pharynx, loosening it from its attachment, partly by direct pressure and partly with his finger-nail. This proceeding was practised with equal success in another case by Sabatier.[4] Gross[5] also contrived to remove a large polypus situated far back in the nasal fossa by "breaking it off with the index finger introduced into the mouth, and carried round the palate."

Abscission.—This method of treatment may be carried out either with the snare, écraseur, or cutting-forceps. Since Hilton (see History) recommended the snare it has been widely used, and Durham[6] observes that in his experience this method has proved "more easy and effectual, and less painful, and less likely to prove mischievous than other methods commonly adopted." Except when instruments provided with Zaufal's arrangement (p. 270) are employed, the following is the best way of applying the snare:—The noose having been introduced vertically should be turned into a horizontal position, and made to encircle the polypus, when it is pushed upwards as far as it will go, in order to seize the pedicle as near as possible to its root. If the growth be very far back and hang into the naso-pharynx, the snare may be put round it, by passing a string through the nose by means of Bellocq's sound. The nasal extremity of the string is then attached to the noose, which is drawn up to the tumour by traction on the buccal end of the string. The loop is next adjusted with the help of the index finger, and tightened in the ordinary way. For the slow strangulation of growths which show a tendency to bleed, Jarvis's instrument, or one of the modifications of it, is particularly useful. My nasal écraseur (Fig. 59, p. 272) will also be found serviceable in these cases.

---

[1] Holmes's "System of Surgery," 1st ed. 1862, p. 216.

[2] "Monatsschrift für Ohrenheilkunde." 1882, No. 1.

[3] "Opuscules de Chirurgie." Paris, 1768-72.

[4] "Médecine Opératoire." Paris, 1824, t. iii. p. 283.

[5] "System of Surgery," 6th ed. Philadelphia, 1882, vol. ii. p. 291.

[6] "Holmes's System of Surgery," 2nd ed. 1870, vol. iv. p. 300.

Gant has adapted grape-scissors for the removal of polypus from the nose, and has successfully used the instrument in several cases (Fig. 50, p. 265). The most convenient way of carrying out abscission, will, however, I believe, be found in the employment of my punch-forceps (Fig. 51, p. 266), which is so slender that it can be easily passed along the nasal passages without obstructing the view of the operator, yet so strong that it readily cuts through the pedicle of any polypus. With this instrument the slipping off of the wire which, in spite of every precaution, must occur very frequently with the snare, is avoided. Surgeons who, not having the necessary apparatus, cannot employ the more perfect method of electro-cautery, will find that with the punch-forceps they can generally quickly clear the nasal passages. My clinical experience of the superiority of forceps over snare and écraseur has been recently confirmed by the very important anatomical researches of Zuckerkandl,[1] who, after a careful study of the deep origin of nasal polypi, points out that in many instances "forceps can accomplish more than the snare."

In some cases, with the view of preventing recurrence, it is desirable, as already remarked (p. 371), to remove a small portion of one of the spongy bones. This can be most easily done with my punch-forceps. The operation can be carried out more satisfactorily if an anæsthetic is given, as in removing a part of the middle turbinated bone painful pressure is sometimes brought to bear on the upper part of the nostril. The following cases illustrate the advantage of taking away a piece of a turbinated bone :—

---

[1] Op. cit. p. 81.

Case 1.—Mr. E. F., aged thirty-seven, consulted me in May, 1875, on account of polypus in the right nasal passage. The symptoms commenced in January, 1871, and he then was operated on twice with forceps by an eminent surgeon. The growth returned, and Mr. F. was again treated in the same way by the same operator, in the following August. The nose remained clear till July, 1872, when polypi again formed, and Mr. F. placed himself under another surgeon who in two months (twenty-five visits) removed a number of polypi with a snare. The patient believed himself cured, but remained well only seven months. He then went back to the last operator, who performed repeated operations with the snare through the year 1873, and indeed up to May, 1874, when the nose became quite clear. In December the polypus again showed itself, and the next month the patient applied to me. On making a careful examination I perceived a large polypus growing from the anterior half of the middle turbinated bone. In view of the repeated recurrence, I determined to remove a portion of bone. This was easily done. (The appearance of the growth with a portion of bone after its removal is shown in the annexed cut.) The patient came to me (1880) on account of follicular disease of the throat, when I learnt that there had been no recurrence of the nasal polypus, nor any unpleasant effects from the removal of the bone.

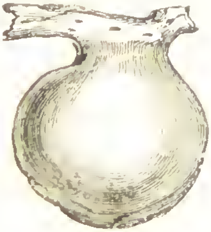

FIG. 82.—POLYPUS WITH PORTION OF BONE REMOVED WITH NASAL BONE-FORCEPS.

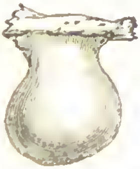

FIG. 83.—POLYPUS WITH OSSEOUS LAMINA REMOVED WITH THE NASAL BONE-FORCEPS.

Case 2.—Mrs. L., aged fifty-nine, consulted me in July, 1878, on account of polypus in the right side of nose. Since 1871 she had been treated by seven different practitioners. Of these five had used forceps, one a snare, and one electric cautery. The latter treatment had been carried out in 1876 and the beginning of 1877, and the polypus had been burnt sixty-four times. Mrs. L. said that this treatment was not painful, but it caused "a peculiar sensation which went to her brain." I removed a bit of the middle portion of the turbinated bone with a small polypus attached (Fig. 83). I saw this patient again in June, 1881. The nose had remained free from any recurrence of the disease, and no inconvenience of any kind had been experienced since the operation.

Electric Cautery.—This method was first introduced by Middeldorpf,[1] and subsequently improved by Voltolini,[2] Thudichum,[3] and Michel,[4] by all of whom it is strongly recommended. I consider it by far the best method of treatment which exists.[5] Patients who have had the opportunity of comparing this method with evulsion invariably prefer electro-cautery. It is much less painful, and the *pain ceases the moment the current is turned off*: it has also the great advantage of not causing any hæmorrhage. The only drawback to the method is that it is tedious, and requires many sittings. I employ a flat spatula-like electrode, and endeavour to push it backwards over the surface of the mucous membrane, from which the polypus grows. The cure can be most quickly accomplished by using the cautery and the punch-forceps on alternate days, the latter being only employed for taking away the dead tissue. Some practitioners prefer using the electro-cautery in form of a loop, but the trouble of applying the snare, in my opinion, complicates the operation. Sneezing is often caused by the cautery, but in my experience never comes on till after the withdrawal of the electrode.

---

[1] "Die Galvanokaustik." Breslau, 1854.

[2] "Die Galvanokaustik." Breslau, 1867.

[3] "Polypus in the Nose," 1st ed. London, 1869. See also 3rd ed. 1877.

[4] "Krankheiten der Nasenhöhle." Berlin, 1876, p. 56, et seq.

[5] Those who are not in the habit of working with electro-cautery will, of course, find it a troublesome method, and it can really be only carried out successfully by those who constantly employ it.

FIBROUS POLYPI OF THE NOSE.

Though fibrous polypus of the naso-pharynx is not unfrequently met with, this form of tumour extremely seldom originates in the nose itself, the only case, as far as I am aware, in which such a growth has been actually proved to exist being one of my own, hereafter related. There are, however, two other instances in which there is every reason to believe that the tumours were fibromata. One of these was reported by Gerdy[1] as having occurred in a boy aged thirteen. The left nostril had been occupied by a growth for eighteen months, and endeavours had been made to remove it with the ligature and by evulsion, but the tumour was so hard that the blades of the forceps were turned. The patient finally died of hæmorrhage, brought on by an attempt to cut through the base of the polypus with a bistoury. After death the growth was found to be attached to the posterior part of the vault of the left nasal fossa; its substance was very firm and elastic, and could not be torn with the fingers, and on section it was seen to be of purely fibrous structure. In the other case, which is related by Lichtenberg,[2] the polypus was found to spring from the upper turbinated body; there were also some polypoid excrescences, apparently independent of the larger growth, attached to the under surface of the cribriform plate of the ethmoid. The microscope does not appear to have been used in either Gerdy's or Lichtenberg's cases.

The *treatment* consists in removal of the tumour, if possible *per vias naturales*. According to its situation, it should be attacked, either anteriorly or posteriorly, by evulsion, abscission, or electric cautery. Lichtenberg, however, in order to obtain access to the growth on which he operated, was obliged to perform temporary resection of the bridge of the nose. The following are the details of my own case:—

Mrs. M., aged thirty-five, consulted me, by the advice of Mr. Crowdy, of St. John's, Newfoundland, on the 12th February, 1877. She had suffered for two years from obstruction of the right side of the nose. On making an examination the pharynx was found to be very granular, and there was general inflammation of its posterior wall. The anterior nares were healthy. Owing to the extreme nervousness of the patient, it was impossible to make a satisfactory post-rhinoscopic examination, and it was not until she had been under my care some weeks that I succeeded in obtaining a view. I then discovered a large red, smooth, irregularly oval growth, blocking up and projecting beyond the right choana (Fig. 84). On examination with the sound, the polypus was found to be hard, but slightly elastic, and from its mobility appeared to be pedunculated. On the first attempt I succeeded in seizing it and tearing it away with short, curved, blunt forceps. After removal the stump could be felt on the roof of the nasal fossa, well within the cavity; the growth was the size of a pigeon's egg, and on section was hard, dense, and pale. Microscopically it was seen to be composed of closely interlaced whitish fibres, with a few minute cells lying among them.

---

[1] "Des Polypes et de leur Traitement." Paris, 1833, p. 19.

[2] "Lancet." 1872, vol. ii. p. 773, et seq.

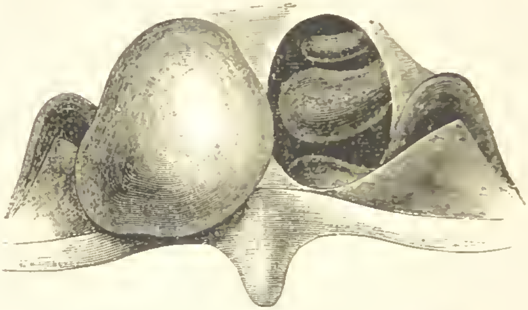

FIG. 84.—FIBROUS POLYPUS OF THE NOSE.

View of the growth as seen by posterior rhinoscopy.

PAPILLOMATA OF THE NOSE.

Small warty growths are sometimes found in the nose, and according to Hopmann,[1] they are much more common than is generally supposed. In a series of one hundred cases of growths in the nasal cavities this observer met with no fewer than fourteen examples of papilloma.[2] These were of two pathological varieties, viz., epithelial papilloma, or benign cauliflower excrescence, and soft papilloma: the latter being subdivided, according to the predominance of gland-structure, vessels, areolar tissue, or proliferating cells, into adenoma, angioma, fibro-sarcoma, and fibro-sarcoma papillare. The growths generally varied in size, roughly speaking, from a pea to a hazel-nut, but Hopmann removed [1] one which measured four centimetres in length and from one to one and a half in breadth and thickness. In several instances the tumours were multiple, as many as ten or twelve being present in one case. They were invariably attached to the lower turbinated body, generally springing from its convex surface, or its lower border, but sometimes from its concave portion. The symptoms caused by the presence of these tumours were frequent cough and expectoration, dry catarrh, and in some cases retching of such severity as to excite suspicion of gastric disease. There were also the usual signs of obstruction of the nasal passage, and in two cases there was some bleeding.

---

[1] "Virchow's Archiv." Bd. xciii. 1883.

[2] From a more recent paper by Hopmann ("Wien. med. Presse," 1883) it appears that Schäffer, of Bremen, has found twenty cases of papilloma among one hundred and eighty-two nasal polypi.

Had it not been that Hopmann shows himself [2] to be perfectly familiar with the appearance and symptoms of general thickening of the inferior turbinated body, a comparatively common complaint, which has already been described (p. 317, et seq.), it might have been supposed that he had mistaken this condition for true papillary neoplasia. It would seem, however, to result from this observer's investigations, that many growths which closely resemble mucous polypi, are really of papillary structure; this, at least, is the only way in which the wide discrepancy between his observations and those of other pathologists can be explained. For my own part I must confess that although I remove polypi from the nose almost daily I now hardly ever make any microscopical examination of the growths, and this may account for the fact that I have met with only five undoubted examples of intra-nasal papilloma. In all of them the tumour was situated on the mucous membrane over the lower and anterior part of the septum, or on the inner plate of the alar cartilage where it joins its fellow in the middle line close to the tip of the nose. In no instance was the excrescence larger than a split pea, and in four of the cases there were at the same time mucous polypi in the nasal fossa. The specimen in the Museum of the Royal College of Surgeons, described in the catalogue (No. 2,201 C) as a polypus, has more the appearance (see Fig. 77, p. 320) of a papilloma. Zuckerkandl [3] met with only one example of true papilloma, and this was situated on the middle of the lower turbinated body; but three other cases which he describes as "polypoid excrescences," bear a close

[1] Loc. cit. p. 225. [2] Loc. cit. p. 247. [3] Op. cit. p. 70.

similarity both to the specimen in the Hunterian Museum just referred to, and likewise to some of Hopmann's cases.

The application of strong nitric acid or electric cautery rapidly destroys these growths, but they can also be removed with the cutting-forceps or snare, and Féré[1] has reported a case in which he effected a cure with a ligature.

Erectile Tumour of the Pituitary Membrane.

An extraordinary case of this kind (probably analogous in its pathological characters to the vascular variety of soft papilloma described by Hopmann) was reported by Verneuil,[2] in 1875. The patient, a Roumanian, aged fifty-two, had been subject to frequent and abundant bleeding from the nose since boyhood. During the ten years previous to his coming under notice, the hæmorrhage had become so formidable as to have reduced the patient to an extremely anæmic condition. Various internal remedies were tried, without avail, and the inside of the nose was cauterized, with the view of healing a supposed ulcer within the cavity. When the eschar came away, however, the bleeding broke out again as severely as before. At this time he consulted Verneuil, who, after a careful examination, found, on the left side of the septum, a round, dark-red, sessile swelling of the size of a cherry-stone, pulsating synchronously with the heart. Several other small erectile patches were found in various parts of the patient's body—the right temple, the soft palate, &c. No hæmorrhage, however, had ever been known to occur from any of those spots. At a second examination, made in the presence of M. Gosselin, Verneuil failed to discover the tumour in the left nasal fossa, but found a swelling exactly similar in character on the right side. Radical measures having been decided on, Verneuil laid open both sides of the nose, and destroyed the greater part of the septum with the actual cautery. The parts were then douched with cold water for some time, and the wound was closed on the left side, the right being allowed to remain open, and plugged with lint steeped in perchloride of iron. Wet compresses were kept constantly applied to the brow and nose. In spite of this there was pretty sharp bleeding on several occasions, and Verneuil was obliged once more to apply the actual cautery to the interior of the right nasal fossa. There was no further hæmorrhage, and in a short time the patient was able to return to Roumania. Two years after the operation the patient continued well, but four years later he appears to have died in a state of extreme cachexia; Verneuil states, however, that he was unable to obtain any details on this point.

---

[1] "Bull. de la Soc. Anat." 1880, 4e série, t. v. p. 587.

[2] "Annales des Maladies de l'Oreille," &c. t. i. p. 169, et seq.

Exchondromata of the Nose.

Cartilaginous tumours of the nose are very rare. Examples have, however, been reported by Erichsen,[1] Bryant[2] (two cases), Ure,[3] Durham,[4] Richet,[5] Heurtaux,[6] and Verneuil,[7] and I have myself met with one example of the affection. The disease belongs essentially to the period of life when the growth of the body is most active, all the patients whose cases have been quoted above having been under the age of eighteen.[8] As regards sex, the disease shows a slight preference for the male sex.

The most marked *symptoms* are obstruction of the nasal passages, and deformity in advanced cases amounting to "frog-face" (see "Fibrous Polypi of the Naso-Pharynx"). The ordinary phenomena of catarrh, such as abundant discharge and sneezing, have sometimes been observed. In the patient I treated the discharge was of such an offensive character, that the disease had been mistaken for ozæna. The growth may vary in size from a hazel-nut to a man's fist, or may be even larger. The tumour, when small, closely resembles a fibrous polypus, but it is never distinctly pedunculated, and usually springs from the cartilaginous part of the septum, although in rare cases it may originate from the outer wall or roof of the nose.

---

[1] "Lancet," 1864, vol. ii. p. 152.

[2] Ibid. 1867, vol. ii. p. 225.

[3] "Holmes's System of Surgery." London, 1870, 2nd ed. vol. iv. p. 319.

[4] Ibid.

[5] Casabianca: "Des Affections de la Cloison." Paris, 1876, p. 59.

[6] "Bull. de la Soc. de Chir." Nov. 7, 1877.

[7] Quoted by Spillmann: "Dict. Encyclop. des Sciences Méd." t. xiii. p. 184.

[8] In Heurtaux's case the age is stated as twenty-two, but the disease had been in existence for five years.

The *prognosis* is favourable if the disease is detected at an early period, as the growth shows no disposition to return when once removed, but if it has attained large dimensions before treatment is commenced, it may happen that a cure cannot be effected without making an external incision, and thus causing a more or less unsightly scar.

The *diagnosis* is difficult when the growth has attained a large size, as it may be mistaken for fibrous polypus, a malignant neoplasm, an exostosis, or an osteoma. The extreme rarity with which fibroma commences in the nose almost permits its exclusion from consideration. Malignant tumours have not the dense consistence of enchondromata, bleed more readily and grow more rapidly, whilst bony formations are very hard, and cannot be penetrated by a needle, like cartilage.

Surgical *treatment* is alone of any service, and the snare is the best instrument that can be used, its employment with electric cautery being especially indicated. In my own case, however, which is detailed below, I had no difficulty in cutting through the mass with the cold wire.

CASE OF ENCHONDROMA REMOVED WITH THE SNARE.

Miss E., aged thirteen, was brought to me, in September, 1874, on account of an offensive discharge from the nose, from which she had suffered for two years. She had been treated for "polypus" and "ozæna" by different surgeons, but without deriving any permanent benefit. There was a marked prominence of the right side of the nose, mid-way between the inner canthus of the eye and the upper border of the alar cartilage. On examining the nose with a speculum, a round, nodulated tumour was seen in the right nasal fossa. The growth, which was firmly attached, was of a purple red colour and slightly ulcerated at its outer part. It so completely occupied the fossa, that it was only after repeated examinations that its origin from the upper and back part of the cartilaginous septum could be made out.

A needle passed into the tumour without much difficulty, and caused but little hæmorrhage, and it was thought that the growth was a fibroma.

Several attempts at removal with the forceps proved unavailing; but I ultimately succeeded in passing a wire round the tumour and cutting it through. Even after the growth was separated, however, it was impossible, owing to its size, to draw it through the nostril: and it was only by dividing it into two portions with the snare, that it could be got out. After its removal, its base was seen to be about half an inch in diameter. On microscopical examination of the tumour, its central portion was seen to consist almost entirely of hyaline cartilage, but towards its circumference there were numerous bundles of white fibres, and a small amount of yellow elastic tissue.

It looked as if it had originally been covered with a fibrous envelope, which had been subsequently destroyed in places by erosion. The patient made a rapid recovery; but slight thickening of the septum remained, and indeed had not entirely disappeared nine months after the operation.

OSTEOMATA OF THE NOSE.

Latin Eq.—Tumores ossei nasi.
French Eq.—Tumeurs osseuses du nez.
German Eq.—Knochengeschwülste der Nase.
Italian Eq.—Tumori ossei del naso.

DEFINITION.—*Bony tumours, generally of exceedingly dense but occasionally cancellous structure, varying in size from a bean to a hen's egg, and sometimes even larger, having no connection with the osseous framework of the nose, causing obstruction of the nasal passages, and if allowed to attain a great size eroding and frequently perforating the parietes of the nasal cavities.*

History.—The mention of "osseous" tumours of the nose is not uncommon in the older writers, but the actual literature of the subject is altogether modern, and, as might be presumed from the rarity of the affection, is also very scanty. Some doubtful cases were collected by Bordenave[1] in the latter half of last century, and a few scattered examples may be found in the medical journals of the earlier part of the present century. Follin,[2] however, appears to have been one of the first to call attention to such growths as a substantive disease, quite distinct from exostosis. Cases have since been reported by Hilton,[3] Pamard,[4] and Legouest,[5] and the complaint has been made the subject of special research by Ollivier,[6] Gaubert,[7] and Rendu.[8] A good chapter on nasal osteomata may be found in Follin and Duplay's[9] large work, and quite recently Spillman[10] has discussed these singular growths with great care.

---

[1] "Memoires de l'Académie Royale de Médecine." Paris, 1774.

[2] "Des Tumeurs osseuses sans connexion avec les os."—"Bull. de la Soc. de Biologie." Paris, 1850-51.

[3] "Guy's Hosp. Reports," series i. vol. i. p. 495.

[4] "Exostose éburnée de la Fosse nasale droite."—"Bull. de la Soc. de Chir." 1866.

[5] "Exostose . . . . occupant la Fosse nasale gauche."—"Mém. de l'Acad. de Méd." 1865-66.

[6] "Sur les Tumeurs osseuses des Fosses nasales." Thèse de Paris, 1869.

[7] "Des Ostéomes de l'Organe de l'Olfaction." Thèse de Paris, 1869.

[8] "Des Ostéomes des Fosses nasales."—"Arch. Gén. de Méd." Août, 1870.

[9] "Traité Elém. de Pathologie externe." Paris, 1877, tom. iii. p. 859, et seq.

[10] "Dict. Encyclop. des Sciences Méd." 2e série, t. xiii. p. 169, et seq.

Etiology.—The causes of osteomata are quite unknown. The only point about which there is any certainty is that the affection belongs to the period of adolescence. Most of the patients who have suffered have been about twenty years of age, though sometimes the disease has escaped observation till a later period. As far as can be ascertained both sexes are equally liable to the complaint.

Symptoms.—The most characteristic symptom in the early stage of the disease is an itching sensation in and about the affected part, which is sometimes so intolerable that the patient is compelled to relieve himself by constantly scratching the inside of his nose. As soon as the tumour attains any considerable volume it gives rise to the usual symptoms of obstruction. There is often impairment of the sense of smell, and epistaxis generally becomes frequent and severe as the growth develops. The patient usually complains of severe neuralgic pain, caused, no doubt, by the pressure of the bony mass on neighbouring nerve-filaments. The growth, as a rule, is covered with mucous membrane of a bright pink colour, but its surface is occasionally dark red or even purple in hue. At times the membrane is discoloured or even ulcerated, and, in some instances, necrosed bone becomes visible. Owing to the ulceration or necrosis, or to the mere retention of the secretions which the tumour causes, there is usually a fetid discharge. As the growth enlarges, it may press on the septum, twist the nose to one side, and entirely obliterate the genio-nasal furrow; or, extending towards the antrum or the orbit it will produce corresponding deformities, such as unnatural fulness of the cheek, or displacement of the eyeball. The pain in most cases becomes extremely severe, but occasionally the pressure produces anæsthesia of the adjoining parts.

Diagnosis.—A nasal calculus or an exostosis may simulate an osteoma in the earliest stage of the affection. It should therefore be remembered that osteomata, unlike bony outgrowths, can at the outset be moved when pressed on with a strong probe, and that their surface cannot generally be broken with a sharp needle, as is the case with a calculus. When, however, an osteoma is encrusted with calcareous deposit, as in the case of Legouest,[1] the diagnosis is rendered extremely difficult. Enlargement of the turbinated bodies might by an inexperienced observer be mistaken for an osteoma, but whilst the latter is almost always unilateral, thickening of the turbinated bodies almost invariably affects both sides. Moreover, the tissues over the spongy bones are soft, and quite

[1] Loc. cit.

unlike the structure of osteomata. As the disease develops, the severe pain caused by the pressure of the hard mass at once differentiates osteomata from any other kind of nasal tumour except cancer, from which, again, they may be distinguished by their much slower rate of growth. Fibrous tumours of the nose are so rare that they need scarcely be taken into consideration, but an offshoot from a naso-pharyngeal polypus into one of the nasal fossæ might possibly be mistaken for an osteoma unless the naso-pharynx were explored. A digital examination of the posterior nares will, however, soon settle the question. Occasionally a mucous polypus may coexist with an osteoma, and this may further complicate the diagnosis.[1]

Pathology.—The tumours are of two kinds—the ivory and the cancellous. The former are much the more common, and they are so extremely firm in structure that the strongest forceps are sometimes turned by them. They are covered with periosteum, and well supplied with vessels, which pass into the substance of the tumour. They are generally connected with the soft tissues of the nose by a narrow pedicle. Although they appear to originate from the mucous membrane, it is more probable that they really grow from the periosteum, or that they commence as exostoses, their bony connection with the skeleton being destroyed at so early a period, that it has never been observed. It is possible also that in some cases they may be originally of cartilaginous structure, and subsequently undergo ossification. On section these growths are seen to consist of a number of layers of bone which correspond with the depressions and elevations on their surface. The cancellous osteomata, as a rule, present the usual structure of cancellous bones—that is to say, they consist of an external envelope of compact tissue, with spongy tissue internally, between the trabeculæ of which is contained the ordinary reddish marrow; towards the centre of the bone there is often a distinct cavity.[2]

Prognosis.—The prospects of the patient are very favourable if the tumour can be removed *per vias naturales*; but, if not, the observation made under the head of "Prognosis" in the last article also applies here.

Treatment.—The only treatment is extirpation. The cancellous osteomata can be easily crushed with strong forceps and removed in fragments, whilst in the case of the ivory-like growths, it is generally necessary to lay open the nose. Rouge's operation (see "Fibrous Polypi of the Naso-pharynx,") should be performed in the first instance, but if sufficient room cannot be obtained in this way, one of the other methods described in the same article should be adopted.

---

[1] Legouest: Loc cit.

[2] Richet: "Bull. de l'Acad. de Méd." 1871.

EXOSTOSES OF THE NOSE.[1]

Exostoses are not very uncommon, though they seldom attain a large size, and hence do not give rise to much inconvenience. My clinical experience had led me to believe that they most commonly spring from the floor of the nose, a short way from the orifice. This, however, is not confirmed by observations made on preserved crania, for among 2,152 skulls in the Museum of the College of Surgeons, I found 170 examples of bony outgrowth originating from the septum, 91 being in the left, and 79 in the right nasal fossa. In three of these cases there were two distinct exostoses, both, however, being in each instance in the same nasal fossa. The size varied from a split pea to half a haricot bean, and they sprang, as a rule, by a broad base from the septum, extending horizontally towards the outer wall and terminating in a more or less pointed crest. The situation of the tumour was generally opposite the middle turbinated bone, or just midway between that and the lower bone, so that the peak seemed in some cases actually to run into the orifice by which the antrum communicates with the middle meatus: in a minority of instances the exostosis was opposite the lower turbinated bone. In many cases these prominences formed, as it were, the posterior spur of a bony ridge running along the septum at the junction of the ethmoid and the vomer, or of the latter and the crest of the upper maxilla. Ridges of this kind existed in 673 skulls (31·2 per cent. of the total number examined). In 375 instances the projection was on the left side; in 231 on the right; whilst in 67 cases there were ridges on both sides. The size varied from a slightly raised line to a rough jagged ledge encroaching considerably on the cavity of the corresponding nasal fossa. It is probable that in most cases a considerable portion of the ridge would be visible from the front (see Fig. 86, *c*). According to Thudichum,[1] exostoses sometimes grow from the turbinated bones, but this must be extremely rare, since in the large number of skulls above mentioned I only met with one example. In that case the growth sprang from the middle turbinated bone and ran horizontally across the nasal fossa almost to the septum.

---

[1] A few forms of exostoses of rare kinds will be referred to under the head of "Synechiæ."

Exostoses present an irregular surface, and occasionally cause slight deviation of the septum. It will be found impossible to penetrate them with a sharp needle, a peculiarity which serves to differentiate them from the softer tumours. I have never met with any instance in which the outgrowth caused serious inconvenience, but no doubt cases occur in which, by blocking up the antrum, it may give rise to disease within that cavity, and there may be others in which smaller exostoses cause considerable irritation by their presence. If it is thought advisable to interfere with them, bony outgrowths would probably be best treated by means of the dentist's drill, as recommended by Goodwillie,[2] of New York. Thudichum states that they can be removed by means of the electric cautery wire, but I quite agree with Spencer Watson,[3] who points out the disadvantages of this mode of treatment in these cases, and remarks that "a pair of scissors would answer equally well, or even better." The projecting piece of bone, when small, can also be easily broken off with the common polypus-forceps; when it is large and is attached to the septum by a broad base my nasal bone-forceps (Fig. 55, p. 268) will be found most serviceable.

MALIGNANT TUMOURS OF THE NOSE.

Latin Eq.—Tumores maligni nasi.
French Eq.—Tumeurs malignes du nez.
German Eq.—Bösartige Geschwülste der Nase.
Italian Eq.—Tumori maligni del naso.

DEFINITION.—*Malignant neoplasms, mostly of sarcomatous, more rarely of carcinomatous, nature, originating as a rule*

---

[1] "Lancet," Sept. 1868.
[2] "New York Med. Record," Nov. 12, 1881.
[3] "Diseases of the Nose." London, 1875, p. 290.

from the septum, but occasionally from the outer wall or the floor of the nasal fossæ, giving rise to obstruction of the nostril, muco-purulent discharge often offensive in character, and epistaxis, tending as they increase in volume to encroach upon the adjoining parts, leading in some cases to secondary deposits in other organs, and finally to cachexia and death.

History.—All the old writers who treat of nasal polypi state that these growths are sometimes of malignant nature. Among the five varieties of polypi described by Hippocrates[1] there is one which he calls a "kind of cancer." He mentions that this form of tumour is found "on the side of the cartilage near its extremity," and the treatment indicated is destruction with the hot iron, and subsequent dressing with powdered hellebore and "flower of copper" boiled in honey. Celsus[2] was strongly opposed to any interference with a class of nasal polypi which he described as of malignant nature, and only likely to be made worse by treatment. Abulcasis[3] described cancerous polypus under the name of "scorpion," and other mediæval writers, such as William of Salicet,[4] Rogerius,[5] and Bruno Longoburgensis,[6] expressly distinguished between simple nasal polypi and those of malignant nature. Ambroise Paré[7] reproduced Hippocrates' five classes of nasal polypi, and his description of their various characters, including, of course, the malignant kind. Glandorp[8] merely echoed the general opinion of antiquity in deprecating any interference with cancer of the nose except by way of palliation. Pott[9] was emphatic in condemning any attempt at operation in the case of malignant nasal polypi, saying that he had seen an "untoward-looking polypus so attached to a distempered septum" that they were both pulled away together by the surgeon's forceps. Cases of undoubted cancerous growths in the nose were reported by Palletta[10] and Gerdy.[11] Syme[12] strongly disapproved of any interference with malignant nasal growths, except when the substance is so soft that it can be scooped out with the finger. In recent times cases of sarcoma of the nasal fossæ have been published by Fayrer,[13] Viennois,[14] Mason,[15] Grynfeldt,[16] Duplay,[17] and

---

[1] "De morbis," lib. ii. Littré's edition. Paris, 1851, vol. vii. p. 53.

[2] "De medicinâ," lib. vi. cap. viii.

[3] "La Chirurgie d'Abulcasis," lib. ii. c. xxiv. Trad. du Dr. Lucien Leclerc. Paris, 1861, p. 93.

[4] "Chirurgia Guilielmi de Saliceto," lib. i. cxvii. Venetiis, 1546.

[5] "Rogerii medici celeberrimi Chirurgia," cxxxiii. De cancro qui fit in naribus.

[6] "Bruni Longoburgensis Chirurgia magna," lib. ii. c. ii. De polypo. Venetiis, 1546.

[7] "Œuvres Complètes," livr. 6, ch. ii. vol. i. p. 378 of Malgaigne's edition. Paris, 1840. The distinguished editor appears to have been under the impression that this classification of Paré's was original (see note, ibid. p. 379).

[8] "Tractatus de polypo, narium affectu gravissimo, observationibus illustratus." Bremæ, 1628, cap. xvii. p. 47, et seq.

[9] "Some Remarks on the Polypus of the Nose" in "Chirurgical Observations." London, 1775, p. 59.

[10] "Exercitat. pathol." Mediolani, 1820, p. 1, et seq.

[11] "Traité des Polypes." Paris, 1833.

[12] "Principles of Surgery," p. 493.

[13] "Medical Times," July 4, 1868.

[14] "Lyon Médical," 1872, No. 18.

[15] "Medical Times," May 22nd, 1875.

[16] "Montpellier Médical," Oct. and Dec. 1876.

[17] "Traité Elém. de Pathologie externe. Paris, 1877, t. iii. p. 846.

Hopmann,[1] whilst examples of epitheliomatous disease of the same cavities have been met with by Verneuil[2] and Péan.[3] Duplay[4] mentions a case of encephaloid cancer of the septum, which was mistaken for an abscess; and a case of medullary carcinoma of the nasal passages was reported by Neumann.[5]

---

[1] "Virchow's Archiv." Bd. xciii. 1883.
[2] Bonheben: "De l'Extirpation de la Glande et des Ganglions sous-maxillaires." Thèse de Paris, 1873.
[3] Quoted by Casabianca, "Des Affections de la Cloison des Fosses nasales." Paris, 1876, p. 67, et seq.
[4] Op. cit. t. iii. p. 788.
[5] "Œsterr. Zeitschr. f. prakt. Heilk." 1858, iv. 17.

Etiology.—Malignant disease of the nasal fossæ is not of frequent occurrence, carcinoma in particular being extremely rare in this situation. Its causation is as obscure as that of cancer or sarcoma in other parts of the body. Although in most of the cases on record the patients have been women, the number is too small to form a trustworthy index as to the relative liability of the sexes. It is possible that syphilitic ulceration may sometimes lead to the development of malignant disease, but this has received little confirmation from clinical facts. The only reported instance, so far as I am aware, in which such a relation appears probable, is that of Neumann. This was a case of medullary carcinoma, occurring in a woman whose age is not stated; there had been complete occlusion of the nostrils for eleven years, and there were also signs of former syphilitic ulceration of the throat. There was hypertrophy of the mucous membrane covering the turbinated bones, and on removal one portion of the redundant tissue was proved to be malignant. In this case I think it is clear that the disease had only recently assumed a malignant character.

Symptoms.—There is at first nothing more than the symptoms common to all growths in the nasal fossæ, viz., obstruction to the free passage of air through the channel, with the usual alteration of the voice and impairment of the sense of smell. There is also some discharge from the nostril, which is often of a greenish tint, and extremely fetid. Frequent and severe epistaxis takes place in most cases, and great pain is often complained of in the infra-orbital region. As the tumour increases in size, the bones forming the bridge of the nose may be pushed forward or separated from each other, and protrusion of the eyeball may be caused by pressure on the inner wall of the orbit; or the base of the skull may be eroded, and even perforated, by the upward growth of the tumour. In one of Gerdy's cases, nothing remained of the ethmoid bone but the crista galli, whilst in another, related by Paletta,[1] the cribriform plate of the same bone was destroyed, and the diseased mass extended into the brain. It is obvious that, under such circumstances, cerebral symptoms are likely to occur, whilst if the growth extends backwards through the posterior nares, deafness, dysphagia, and difficulty of breathing may be caused.

Although malignant tumours most frequently originate from the septum, they may spring from any part of the interior of the nose, and Viennois states that he has twice seen melanotic sarcoma develop from the ala. In one of the cases reported by Gerdy, several polypi of malignant nature were found on dissection growing from the pituitary membrane covering the spongy bones, whilst in another a large malignant mass was seen to spring from the mucous lining of one of the sphenoidal cells.

The tumours vary in size from a pea to an orange, though of course they may attain to much greater dimensions if not interfered with. Sarcomata, unlike simple polypi, are generally single and sessile; they are soft, smooth, and usually pinkish in hue, though sometimes dark brown, or even black. They are highly vascular, and bleed easily when touched. Cancerous formations mostly begin as small warts or pimples, which are reddish in colour, and usually very soft and friable. In Péan's case, the growth, although proved to be distinctly epitheliomatous in character, had a kind of pedicle, but this is quite exceptional. As a rule, such tumours show a marked tendency to ulcerate, the ulcer presenting the well-known raised, hard, ragged edges, and sanious base; after a time there is enlargement of the neighbouring lymphatic glands, especially of those lying below the ramus of the lower jaw. Sarcomata are characterized by extreme rapidity of growth, and both forms of disease show a marked tendency to recur after removal.

Diagnosis.—The recognition of malignant tumours of the nasal fossæ is not always easy in the early stage of their development. There is little likelihood, however, even at the outset, of their being confounded with mucous polypi, as the latter are nearly always attached by a pedicle to the outer wall of the nasal cavity, whilst malignant tumours, in the great majority of cases, grow from the septum by a broad base. When the disease is advanced it bears no resemblance to the benign growth. Though originating from the septum, the density of the swellings, the absence of fluctuation, and the frequent ulceration of their surface, will serve to distinguish them from septal abscess. Cartilaginous or osseous tumours may be mistaken for malignant growths, but in most cases the extreme hardness, together with their slow increase in size, and the permanently local nature of the affection, should guide the surgeon to a right conclusion.

---

[1] Op. cit. pp. 7, 8.

Rhinoliths and impacted foreign bodies should not be forgotten in examining tumours of the nose, but the former are often movable, whilst their calcareous surface can generally be recognized on scraping, and they can often be made to sound when struck with the probe ; in the case of foreign bodies, on the other hand, the symptoms are not progressive, and the patients are mostly children. Great rapidity of growth, particularly after partial removal, is a well marked, if not quite distinctive, feature of sarcomatous tumours, whilst epithelioma not unfrequently gives rise to general constitutional infection and cachexy. In all cases, however, which present the least doubt, the nature of the growth should be established by microscopic examination of a small portion of its substance.

Prognosis.—In carcinoma of the nasal fossæ the chance of the patient's ultimate recovery is as hopeless as in cancer of any other part of the body ; but in the case of sarcoma there appears to be some ground for belief that if the disease be treated early and thoroughly, the prognosis is not absolutely bad. Whilst these sheets are passing through the press, as an illustration of this I may mention that I have had an opportunity of seeing a patient from whom Mr. Francis Mason removed a mass of myeloid sarcoma attached to the septum. The ala was raised by means of an incision carried downwards along the side of the nose, and the tumour completely taken away, the raw surface being then saturated with a solution of chloride of zinc (gr. xl. ad ℥j.). Although the man is sixty-seven years of age, and has never been very healthy, there is no appearance of recurrence of disease in the nose, though the operation was done more than seven years ago.

Pathology.—Concerning the pathology of these tumours, little need be said in this place. Both sarcomatous and cancerous polypi offer the characters common to such neoplasms in other regions of the body.

Treatment.—The only proper method of treating malignant disease of the nasal fossæ consists in the thorough removal of the growth where practicable. The plan of procedure to be pursued, however, should be carefully considered, as the difficulties of exposing a tumour in these intricate chambers sufficiently to allow of its complete extirpation are very great, and partial removal only aggravates the mischief. A "preliminary operation" (see "Fibrous Polypi of the Naso-Pharynx") is always necessary.

Often the disease has reached such a stage before the patient comes under treatment, that only palliative measures are applicable. Local astringents are sometimes of use in this way by causing temporary shrinking of the mass, and I have occasionally found electric cautery serviceable in restraining hæmorrhage. This was notably the case in a patient whom I recently treated with Dr. Slimon, of Bow, where bleeding was a very troublesome feature.

SYPHILITIC AFFECTIONS OF THE NOSE.[1]

Latin Eq.—Mala venerea nasi.
French Eq.—Affections syphilitiques du nez.
German Eq.—Nasensyphilis.
Italian Eq.—Malattie sifilitiche del naso.

DEFINITION.—*The local manifestation in the interior of the nose of constitutional syphilis in its so-called primary, secondary, tertiary, and congenital forms, giving rise in mild cases to slight obstruction of the nasal channels by swelling of the mucous membrane, and in severe cases to extensive ulceration and necrosis of the bones which may end in more or less complete destruction of the framework of the nose.*

History.—A graphic and fairly accurate description of nasal syphilis is to be found in the writings of the Chinese emperor Hoang-ty,[2] which date from more than 2,600 years before Christ. Severe swelling, coryza, ulceration, ozæna, and partial or complete destruction of the nose are there described as being among the consequences of a virulent sore on the genitals. This ancient writer also appears to have been acquainted with infantile syphilis as it affects the nose. In the writings of Susruta,[1] together with a description of other unmistakable syphilitic lesions, there is an account of certain nasal disorders due to the same constitutional poison. Doubtless many of the severe affections of the nose described under the general name of *ozæna* by the Greek and Roman writers (see "Dry Catarrh," pp. 324, 325) were of syphilitic origin, but no suspicion of such a relation is shown by these authors. Dion Chrysostome,[2] however, possibly intended to allude to syphilis of the nose in the following passage:—"They say that Aphrodite, to punish the women of Lesbos, inflicted upon them a disease of the armpits; it is thus that the Divine anger has destroyed the noses of the greater number among you." After the terrible outburst of the venereal plague that followed the return of Columbus and his companions in 1496, specific disease of the nose was distinctly recognized by physicians,[3] and the disfigurements of the unlucky feature that often ensued became a favourite subject of jesting among poets and satirists. Possibly this, as well as other serious results of syphilitic inoculation, were more common formerly than at the present day when the treatment of the disease is better understood. In recent years the introduction of the sharp curette by Volkmann[4] has made an important advance in treatment in the more serious cases. In 1876 a pamphlet was published by Clinton Wagner,[5] which contains some useful hints as to the treatment of nasal syphilis, and in the following year Schuster[6] wrote a valuable practical paper, detailing the highly favourable results which he had obtained by Volkmann's plan of treatment, and containing, moreover, a most important contribution to the pathology of the affection by Sänger.

---

[1] Syphilitic lesions of the naso-pharyngeal region will be considered further on in the section on "Throat-Deafness." This arrangement appears the most convenient, as the nasal phenomena in such cases are usually of quite secondary importance as compared with the aural symptoms caused by the disease attacking the Eustachian tube.

[2] See Fabry: "La Médecine chez les Chinois." Paris, 1863, p. 260, et seq.

---

[1] "A'yurvedas." Nidânasthâna, cap. ii. Translated by Hessler, Erlangen, 1844-50. This Indian treatise on medicine, which probably dates from about B.C. 600, is a compilation by Susruta from the teaching of his master D'hanvantare. It has been suggested (Khory: "Digest of the Principles and Practice of Medicine," London, 1879, Preface, p. vi.) that the work is merely a Sanskrit version of some of the Hipprocratic writings, but there appears to be no real foundation for such a statement; and, indeed, the works present no similarity either in matter or form.

[2] "Orationes" ex recens. J. J. Reiskii. Leipsiæ, 1784, vol. ii. orat. 33. (Quoted by Lancereaux, "Treatise on Syphilis." Syd. Soc. Transl. 1868, vol. i. p. 15.)

[3] As nearly every author who treats of syphilis mentions the nasal form of the affection, it seems unnecessary to give a detailed history of the subject. The reader may be referred to the enormous collection of writers on venereal disease contained in the "Aphrodisiacus," first published by Aloysius Luisini, at Venice, in 1599, republished and enlarged up to date by Langerak, at Leyden, in 1728, and continued by Gruner down to 1793.

[4] "Uber d. Gebrauch d. scharfen Loffels, &c." Halle, 1872; and "Beiträge z. Chirurgie." Leipzig, 1875, p. 267.

[5] "Syphilis of the Nose and Larynx." Columbus, Ohio, 1876.

[6] "Beiträge z. Pathologie u. Therapie der Nasensyphilis," von Dr. Schuster u. Dr. Sanger. "Vierteljahrsschr. fur Dermatol. u. Syphilis," 1877, 1 u. 2 Heft. and Ibid. 1878.

Etiology.—An instance of primary syphilitic chancre of the nostril has been related by Spencer Watson.[1] The patient was a nurse in attendance on a lady who gave birth to a syphilitic child. The sore could not be distinctly seen, but there was a swelling within the nostril, accompanied by severe pain, fever and mental depression. The ordinary secondary symptoms followed in due course. The vehicle of infection in this case was probably the patient's own finger. The causes which predispose the nose to attacks of the secondary and later forms of syphilis are unknown, but it is probable that, in persons suffering from venereal disease, chronic catarrh, or any other accidental affection of the nose tends to localize the poison. The strumous diathesis also seems to render its subjects particularly liable to severe forms of nasal syphilis. Extreme cachexia often coexists with the more advanced tertiary lesions of the nose, but it is difficult to say whether this is a cause or a consequence of the local mischief. There seems to be much less liability to the disease at the present time than formerly. It appears, however, that in countries where syphilis has been allowed for centuries to rage without the mitigation of rational treatment, the disorder retains an extraordinary virulence, and shows a strong tendency not only to attack the nose, but to do so at a very early period. The fact of rapid development of tertiary symptoms is well illustrated by the case of some patients received at the Val de Grâce Hospital in Paris on the return of the French troops from Mexico.[1] The disease had been caught from native women, and in two cases severe tertiary symptoms showed themselves within a year, whilst in a third they occurred in less than six months from the date of inoculation. Among the modern Arabs, symptoms which in Europe would be called tertiary not unfrequently come on almost at once, the face, and especially the nose, being the most common point of attack. In Europe, secondary syphilis of the nose is generally met with from three to nine months after the primary sore, whilst tertiary lesions are very seldom noticed until some years after the inoculation of the poison. An exceptional case, however, is related by Mauriac,[2] in which the patient, who had contracted syphilis in Paris, suffered from necrosis of the nasal bones in the seventh month from the appearance of the disease.

---

[1] "Med. Times and Gaz." 1881, vol. i. p. 428.

Secondary phenomena are either rare in the nasal fossæ, or they are frequently overlooked. Davasse and Deville[3] found mucous patches in the nose in eight out of one hundred and eighty-six cases occurring in women, the tonsils having been affected nineteen times in the same series. Bassereau,[1] on the other hand, in a hundred and ten male patients found mucous patches at the edge of the nostrils only twice, the tonsils being affected in no less than one hundred instances. The experience of Bassereau accords much more nearly with my own than that of the first-named observers. At the Val de Grâce in Paris,[2] only one per cent. of the cases treated during five consecutive years showed secondary syphilides of the nose. Tertiary lesions are more common, but even these appear to be rare at the present day, for Willigk[3] met with only 2·8 per cent. in 218 cases.

---

[1] Spillmann: "Dict. Encyclopéd. des Sciences Médicales," t. xiii. 1me part, p. 39.

[2] "Syphilose pharyngo-nasale." "Union Médicale," 1877, t. i. p. 342.

[3] Quoted by Lancereaux: "Treatise on Syphilis." Syd. Soc. Transl. London, 1868, vol. i. p. 174, et seq.

Symptoms.—The phenomena of nasal syphilis vary according to the stage and severity of the disorder. In the secondary period there is generally nothing more than hyperæmia of the mucous membrane, producing symptoms of somewhat intractable catarrh. Sometimes, however, mucous patches can be seen at the external angle of the nostrils, or just inside the nasal fossæ, either on the septum at its anterior part, or on the inferior turbinated body. Similar patches may also be visible, with the aid of the rhinoscope, on the margins of the posterior nares. These lesions sometimes give rise to intractable coryza, with mucopurulent secretion, whilst at the same time roseolar eruptions appear on the skin. In tertiary syphilis perforation of the septum not unfrequently takes place, and the carious bone exhales a horribly offensive odour, to which the term "ozæna," now limited to certain forms of dry catarrh (see p. 330), was formerly applied. In such cases the discharge from the nose is generally abundant, and is often of a blackish colour, and the most careful washing away of the discharge by irrigation or spraying fails to get rid of the stench. Should the vomer be extensively involved, the bridge of the nose may fall in, causing a characteristic flattening, as if the organ had been crushed, whilst if the cartilaginous portion of the septum is destroyed, the tip of the nose sinks in and becomes flattened, and hangs loosely from the bony part of the nose (Fig. 85). Occasionally the whole substance and framework of the feature is disintegrated, and it is represented only by two small apertures surrounded by cicatricial tissue. The disease may extend to the superior maxilla, may destroy the bony walls of the lachrymal canal, or slowly eat away large portions of the ethmoid and sphenoid bones, the basilar process of the occipital bone may entirely perish by slow caries, or large pieces of these bones may be thrown off by rapid necrosis. The cranial cavity is indeed sometimes laid open, and, if this occurs, it is generally soon followed by fatal inflammation of the brain and its membranes. In a case related by Trousseau,[1] a large piece of the ethmoid, constituting about a quarter of the entire bone, almost suffocated a patient by falling unexpectedly into his throat. He died on the following day with acute cerebral symptoms, due no doubt to the disease having spread to the brain or its coverings. Brodie[2] and Graves[3] mention instances in which the disorder, having extended through the cribriform plate of the ethmoid, gave rise to epileptiform and maniacal convulsions which terminated fatally. A case, however, has been recently reported by Baratoux[4] in which almost the entire body of the sphenoid was expelled from the nose without any signs of cerebral mischief having been observed.

---

[1] Ibid. p. 175.
[2] Spillmann: Op. cit. p. 38.
[3] "Prager Vierteljahrsschr." 1856, xxiii. 2, p. 20.

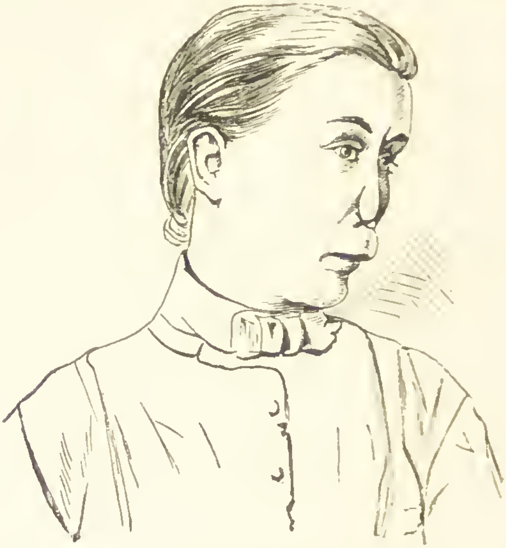

FIG. 85.—FLATTENING OF THE NOSE FROM DESTRUCTION OF THE CARTILAGINOUS SEPTUM BY SYPHILITIC DISEASE.

On examination of the nose in cases of tertiary syphilis, deep foul ulcers with ragged edges and dirty greyish bases can often be made out. When caries exists the part over the diseased bone generally appears blackish in colour, the surface being rough and uneven. Occasionally, however, nothing can be perceived beyond dark-coloured crusts and greenish-yellow mucus, by which the true condition of the underlying tissues is quite concealed. In other cases the pieces of dead bone may be situated so high up in the nasal cavity that nothing can be seen, but even then the probe will sometimes serve to discover them. Now and then, however, the most careful observation may fail to disclose the actual seat of disease, as is well shown by some cases reported by E. Fränkel (see Pathology).

---

[1] "Clinique Médicale de l'Hotel-Dieu." Paris, 1868, t. i. p. 546.

[2] "London Med. Gazette." 1844.

[3] "Clinical Lectures," vol. ii. p. 484.

[4] "Archivii Italiani di Laringologia." Anno iii. July 15, 1883, pp. 19-21.

Diagnosis.—There is seldom much difficulty in recognizing the affection, the only disease with which it can be confounded being lupus exedens when that disorder commences *within* the nose. The age, however, at which lupus begins will generally serve to distinguish it, showing itself, as it does, earlier than any form of syphilis except the hereditary disease, which, on the other hand, has symptoms quite peculiar to itself. Moreover, even at a very early period, the papules or tubercles of lupus are sufficient to identify it, whilst, later on, the marked preference which the morbid process shows for the *cartilages* is very characteristic. Dry catarrh accompanied by ozæna is sometimes mistaken for syphilitic caries, but to those who have had any experience the smell is quite different; moreover, the stench of true ozæna can be got rid of by syringing, whilst the most persevering irrigation leaves the odour arising from diseased bone comparatively unaffected. Should any doubt arise, however, the use of Gottstein's plugs will settle the question, for whilst they quickly put an end to the stench in true ozæna, they greatly intensify it if there is any necrosis or caries.

It is important to remark here that though perforation of the septum far more often results from tertiary syphilis than from any other cause, it is by no means, as is often supposed, an exclusively syphilitic lesion. Leaving congenital deformity and injury out of the question, a permanent hole may result both from septal abscess and blood-cyst, and possibly also from tubercular ulceration (see "Tubercular Disease of the Pituitary Membrane," p. 109).[1] I dwell on this matter with some emphasis, as I have known painful mistakes made through ignorance of the facts just mentioned.

---

[1] See also perforation of the septum in typhoid fever and acute rheumatism (p. 125).

In all doubtful cases the previous history should be carefully inquired into, the skin should be examined for coppery patches, periosteal nodes sought for in the usual situations, whilst cicatrices and induration should be looked for in the tongue, pharynx, and larynx. In the absence of other evidences, the action of iodide of potassium will generally soon determine the nature of the case.

Pathology.—Sänger,[1] who examined several specimens of polypoid excrescences removed by Schuster from the nasal fossæ of patients affected with syphilis, arrived at the following results:—The mucous membrane at one spot was greatly hypertrophied as regards all its elements, and the fold thus formed tended to increase in size as the process continued, and finally, being acted on by gravitation, became pendulous. On section, the mass presented two clearly-defined structural zones: 1st, an inner or erectile one, consisting of a network of venous capillaries, surrounded by connective tissue of dense fibrillar structure, and enclosing acinous mucous follicles, the lobes of which appeared to be encroached upon by the neighbouring tissue, and were undergoing atrophy; 2ndly, an outer cortical zone, consisting of an enormous number of small round cells, uniform in size, and lying closely packed together in a stroma of very delicate areolar tissue. These cells had each a nucleus, and often several nucleoli, and were surrounded by blood-vessels, the coats of which they had, in some places, partly penetrated. Covering the cortical zone was epithelium of the cylindrical non-ciliated variety. In some parts, this epithelium had disappeared, leaving microscopic excoriations, and at those points the round cells were especially numerous. From these appearances Sänger infers that the process had consisted in a primary hypertrophy of the mucous membrane with its vessels and glands, followed by formation of small round cells at the periphery of the tumour, which by gradually encroaching on the vessels and follicles, produced obliteration of their channels at one part, with corresponding dilatation farther back. In this manner the cortical layer of round cells and the erectile zone of dilated venous spaces had been formed. That this infiltration of the mucous membrane by proliferating small round cells is distinctively syphilitic, was proved by comparison of the sections with others of undoubted syphilitic products found in the intestines. Sänger also concluded, from other specimens, that a similar infiltration of the mucous membrane with proliferating small round cells may take place without hypertrophy of the mucous membrane itself. In all cases the cellular infiltration extended some way into the neighbouring tissues, so that no definite boundary could be traced. In other instances, true syphilitic neoplasms (condylomata) were found, the mucous membrane itself being entirely altered in structure, and the epithelium either altogether absent, or reduced to a few layers of poorly-nourished cells. The changes presented by the cartilages and bones at points corresponding to the infiltrated patches of mucous membrane consisted—1st, in exfoliating necrosis, resulting from suppuration; 2ndly, in rarefying syphilitic osteitis or *caries sicca*, the bone having been absorbed and replaced by exuberant granulations of the mucous membrane; and 3rdly, in rarefying and plastic osteitis, the connective tissue of the periosteum and the bone having been transformed into spindle-shaped cells, which had become partly organized again into ordinary connective tissue, and partly into new bone.

---

[1] Loc. cit.

Sänger points out that the view commonly held, that ulceration of the nasal mucous membrane is a necessary antecedent of caries of the underlying bones and cartilages is erroneous, and he maintains, on the contrary, that the bony framework of the nose may be the primary seat of syphilitic caries, in the same way that the frontal bone or the tibia may be attacked by primary syphilitic periostitis.

It should be borne in mind, as pointed out by E. Fränkel,[1] from the post-mortem inspection of three cases, that the necrosis of bone may be molecular, the ulcerations being so minute as altogether to escape observation during life. Fränkel found cirrhotic thickening of the mucous membrane, with partial absorption of the glandulæ, in addition to the disease of the bone.

Prognosis.—In secondary syphilis, and in mild tertiary disease, where the destruction has been slight and the bodily vigour of the patient is but little diminished, recovery is almost certain to take place under a well-directed course of anti-syphilitic treatment. When, however, active caries is going on, the prognosis is necessarily grave, especially if, as is common in such cases, the patient is in a very exhausted condition.

---

[1] "Virchow's Archiv." Bd. lxxv. 1 Heft, 1879.

Treatment.—Syphilitic coryza in the adult rapidly passes away. An ordinary tonic may be given, whilst, locally, the use of a nasal wash of bicarbonate of soda or permanganate of potash will generally effect a cure in a week or two. When *condylomata* are present, they should be touched with tincture of iodine or solid nitrate of silver. In *tertiary syphilis*, more active treatment is required, and constitutional and local measures are alike essential. Iodide of potassium must be given, the dose being gradually increased to ten or fifteen grains three times a day. If this drug, after being fairly tried for some months, fails to bring about a cure, or produces but slight benefit, mercury must be resorted to, either alone or in combination with iodide of potassium. Small doses of the corrosive sublimate may be given twice or three times a day in a decoction of sarsaparilla, or the cyanide of mercury may be administered twice a day in the form of a pill.[1] Considerable advantage will often be found in alternating the remedies. Thus, a case which has improved up to a certain point under iodide of potassium, will generally make some further progress under the influence of mercury, whilst, after a short interval, a return to the iodide will often be attended with very marked and rapid improvement of the symptoms. When there is cachexia, analeptic treatment must, of course, be assiduously carried out.

In all tertiary forms of the affection, local measures are useful, and, indeed, frequently essential. In cases of caries of the bony structures, with foul-smelling discharge, the nasal cavity should be thoroughly cleansed two or three times a day with a lotion of detergent and deodorizing character. Any superficial ulcers which may exist within the nose will be soon brought into a healthy condition by these washes; but, for deep, spreading ulcers, more concentrated remedies are necessary. For this purpose, nitrate of silver, fused on the end of a piece of aluminium wire, suitably curved, may be used. In intractable cases, however, the daily application to the ulcer of iodoform, by means of an insufflator, will often effect a cure where more severe measures have failed. At the same time, stimulating and antiseptic inhalations, such as the Vapor Iodi, V. Creasoti, or V. Pini Sylvestris of the Throat Hospital Pharmacopœia, may be inspired through the nose, or antiseptic sprays may be employed. Dead bone should be removed with suitable forceps *when the fragments are loose* and within view, but it is highly dangerous to use much force in detaching sequestra. Schuster[1] has found the greatest benefit in cases of obstinate ulceration from the free use of Volkmann's sharp spoons (Fig. 66, p. 277), even when no exposed bone could be detected with the sound. The ulcers are first scraped, and afterwards any indurated tissue that may remain is destroyed with nitrate of silver or electric cautery. Schuster's experience agrees with Volkmann's[2] own on this point, viz., that it is precisely in the most severe and apparently hopeless cases of extensive destruction of the bony framework of the nose that treatment with the sharp curette yields the most brilliant results. I have employed these sharp spoons in a few instances, but always with the greatest care. Their use is not altogether free from danger, a case having recently been brought to my knowledge in which death occurred from hæmorrhage whilst the surgeon was scraping out the nasal fossæ of a patient suffering from syphilitic necrosis.

---

[1] ℞ Hydrarg. Cyanid. gr. $\frac{1}{16}$: Sacch. Lactis, gr. $\frac{3}{4}$: Tragacanth. q.s. ; M. ft. pil.

When the diseased bone cannot be seen by the ordinary methods of examination, whilst the symptoms are urgent, it may be advisable to expose the interior of the nose in order to apply strong remedies directly to the affected part. Celsus[3] suggested the extreme measure of laying the nose completely open from the outside, but a sufficiently good view of the cavities and access to all their recesses may be obtained by Rouge's operation (see "Fibrous Polypi of the Naso-Pharynx").

Should the nose be completely destroyed, an attempt may be made to remedy the deformity by a rhinoplastic operation, for a detailed description of which the reader is referred to the ordinary text-books of surgery. Slighter disfigurement may be mitigated by an artificial nose.

HEREDITARY SYPHILIS OF THE NOSE.

Hereditary syphilis is apt to attack the nose at two periods of life, viz., at the time of birth or soon after, and later on in childhood. Newly-born infants are, however, its especial victims, and in them the disease takes the form of severe catarrh. It generally appears within a week or two of birth, seldom commencing after the end of the second month. It is probably dependent, in most cases, on the presence of mucous patches on some portion of the pituitary membrane. although, as a rule, none can be seen. The discharge may be thin at first, but it usually soon becomes muco-purulent. The nasal channel becomes blocked up to such a degree that the troubles described in connection with acute catarrh in infants (see p. 293) as regards sucking and sleeping are often observed. From the swelling of the pituitary membrane and the accumulation and drying of the mucus, the nasal breathing becomes difficult and noisy, and a child thus affected is popularly said to have the "snuffles." The secretion irritates the margin of the nostrils and the upper lip, rendering the skin and mucous membrane at those points red and excoriated. The malady is very chronic in its course, showing little or no inclination to subside spontaneously, and in most cases, if not subdued by treatment, it becomes gradually worse. If caries of the bones and cartilages of the nose ensues, the child is not unlikely to be disfigured for life by a flattened nose.

---

[1] Loc. cit.

[2] "Beiträge zur Chirurgie." Leipzig, 1875, p. 267.

[3] "De Medicinâ," lib. vii. cap. ii.

Where there is caries with discharge, the sudden spontaneous cessation of the secretion is ordinarily, according to Hermann Weber,[1] the precursor of a serious and often fatal brain-lesion. In one case related by that physician, as soon as the discharge ceased, cerebral symptoms showed themselves. Four days later the little patient was seized with rigors and well-marked signs of pyrexia, and on the thirteenth day from the first attack of shivering, death took place. At the post-mortem examination, thrombi were found in the cavernous sinus and left ophthalmic vein. There was evidence of severe meningitis, and the under surface of the left cerebral hemisphere was bathed in pus. Purulent collections were also found in the pleuræ, lungs, and liver.

Syphilitic children are mostly small and feeble, and have an aged, withered appearance. Their skin is of a greyish tint, if it be not covered with a copper-coloured papular eruption or with *pemphigus neonatorum.* Sometimes the infants are apparently healthy at birth, the marasmus only coming on three or four weeks later. Mucous patches will generally be found at the anus, and often at the corners of the mouth and the margins of the eyelids.

---

[1] "Med.-Chir. Trans." vol. xliii. p. 177.

Syphilitic coryza occurring in an infant requires both systemic and local *treatment*. Although in many cases of constitutional syphilis in adults I do not consider that mercury is necessary (see Vol. i., Preface, and pp. 93, 94), yet, in this form of the disease, mercurial treatment appears to me to be the best that can be adopted, the administration of this drug having a very marked influence on the duration and intensity of the affection. It should be given to children in the form of grey powder in doses of from one to two grains twice a day, and if this is found to cause diarrhœa, one grain of Dover's powder or an additional grain of chalk should be combined with each dose of the grey powder. Erichsen[1] recommends the external application of mercury in the manner first proposed by Brodie, as the readiest way of introducing the remedy into the system of a syphilitic child. The following is the method:—A drachm of mercurial ointment should be spread on a flannel roller, which should then be stitched round the child's thigh just above the knee, the medicated surface being next the skin. This ought to be renewed every day for a period of two or three weeks, after which iodide of potassium should be administered in milk or cod-liver oil.

Local treatment is also required almost always, but the difficulty of carrying this out in infants has led to its being much neglected, and the ravages of syphilis in the nose in such cases are largely due to this cause. The following is the best method of washing out the nasal passages of an infant:—The child should be placed in the nurse's lap, and the naso-pharynx plugged by means of the temporary sponge-tampon (Fig. 74, p. 283). The little patient's head should then be slightly raised, and the nose washed out with a fine syringe, or, if it be preferred, a spray or nasal douche can be applied, care being taken in the latter case that too much force is not used. The Collunarium Acidi Carbolici cum Borace, or the C. Potassæ Permanganatis of the Throat Hospital Pharmacopœia, may be employed in half their usual strength.

---

[1] "Science and Art of Surgery." London, 1872, 6th ed. vol. i. p. 670.

TUBERCULAR DISEASE OF THE PITUITARY MEMBRANE.

Latin Eq.—Tubercula membranæ pituitariæ.
French Eq.—Tubercules de la membrane pituitaire.
German Eq.—Tuberkel der Membrana pituitaria.
Italian Eq.—Tubercoli della membrana pituitaria.

DEFINITION.—*A chronic affection of the nose, probably always preceded by tubercular disease of the lungs or other organs, arising from the deposit in the mucous membrane of tubercles which form tumours prone to ulceration.*

History.—Very few examples of tubercular disease of the nasal mucous membrane have hitherto been recorded. In the year 1853 Willigk [1] mentioned that he had once found tuberculosis of the membrane covering the septum. In 1877 Laveran [2] described two cases; and in the following year Riedel [3] added two more. Volkmann [4] soon afterwards briefly referred to the subject, and expressed a belief that many cases of supposed hereditary syphilis of the nose are really of a tubercular character. In 1880 Tornwaldt [5] published a very interesting example of the complaint; and more recently Weichselbaum [6] has given an elaborate pathological report on two cases which came under his notice.

[1] "Prag. Vierteljahrsschrift." 1853, Bd. xxxviii.
[2] "Union Médicale." Nos. 35 and 36.
[3] "Deutsche Zeitschrift für Chirurgie." Bd. x.
[4] "Sammlung klinischer Vorträge." Leipzig, 1879. No. 168-169. p. 31.
[5] "Deutsches Archiv für klin. Med." Bd. xxvii. p. 586.
[6] "Allgemeine Wien. med. Zeitung." 1881, Nos. 27, 28.

Etiology.—Tubercular disease of the nasal mucous membrane is no doubt a very rare affection, but it is likely to be more carefully sought for in future, and in all probability some cases will be met with from time to time. As all these are tolerably sure to be reported, the complaint may in a few years appear to be much more common than it really is. Willigk found the disease once in 476 tuberculous bodies. Weichselbaum noticed only two examples in 146 autopsies of patients dying with tubercle. In 50 bodies of consumptive patients, which E. Fränkel[1] carefully examined by Schalle's method, the nasal cavity was in every case entirely free from tubercular disease. I have never observed a case of tuberculosis of the nasal mucous membrane, but I have no doubt that I have sometimes overlooked it amongst the thousands of cases of laryngeal phthisis which have come under my notice. I have, however, met with two instances in which there was a large perforation in the septum which may possibly have resulted from tubercular ulceration. There was no apparent cause for the lesion; in particular, there was no history of syphilis, nor any trace of that complaint. Tubercular disease is probably always secondary, though in Tornwaldt's case the nasal symptoms preceded by a long time those subsequently developed in the larynx and lungs; and in one of Riedel's cases, though the patient had a somewhat cachectic appearance, there were no physical signs of pulmonary tuberculosis nine months after the removal of a large tubercular tumour on the septum.

---

[1] "Archives of Otology." June, 1881, vol. x. No. 2.

Symptoms.—Tubercular deposit in the mucous membrane of the nose may be seen either in the form of tumours, varying in size from a millet-seed to a bantam's egg, or there may be slight thickening and ulceration of the mucous membrane. In either case there is generally a troublesome and more or less fetid discharge. Though the deposit may occur at any part, it appears to show a preference for the septum. In Tornwaldt's case, however, the mucous membrane covering the turbinated bones was greatly hypertrophied, and there were two reddish-grey tumours of the shape and size of split peas. In Riedel's cases there were both tumours and ulcers. In one a raised ulcer near the left nasal orifice had partly destroyed the ala on that side, whilst in the other the ulcer had perforated the septum. In both instances large tumours occupied the septum. One was two and a half centimetres in length, two centimetres in height, and one and a half in thickness. In the other case there was a somewhat similar tumour, though considerably smaller in size. In both, the growths occupied the posterior part of the septum. Laveran found ulcers on the anterior part of the septum. They were about the size of a (silver) twenty-centime piece, of a greyish colour, and not at all painful. In one of Weichselbaum's cases there were four small ulcers, varying in size from a hemp-seed to a lentil, all situated on the septum, whilst greyish-white nodules were also seen on that partition near the floor of the nose on the right side. Similar nodules were present on the vault of the pharynx, whilst several of the retro-pharyngeal glands had undergone cheesy degeneration. In Weichselbaum's second case the patient, a woman, aged sixty-two, had a soft yellowish-grey nodule of the size of a hemp-seed on the anterior extremity of the right inferior turbinated body. A greyish-white nodule as large as a poppy-seed was also seen on the anterior portion of the right middle meatus, and a small tumour about the size of a hemp-seed was situated at the anterior extremity of the left middle turbinated body. This small tumour was undergoing ulceration at its apex.

The progress of tubercular disease of the mucous membrane is generally slow, and in one of Riedel's cases the ulceration existed for twenty-seven years.

Diagnosis.—When obstinate ulceration or growths are found in the nose of a person suffering from well-marked tubercle of another organ, it may be suspected that the nasal affection is of the same nature. Certainty, however, can only be arrived at by excising a portion of the mucous membrane or growth, and submitting it to microscopic examination. If (lupus or glanders being excluded) clusters of lymphoid cells with giant cells in their centre are found in a reticular connective tissue, there can be no doubt of the presence of tubercle. The *absence* of giant cells is not, however, to be taken as disproving it.

Pathology. — Tubercle, when deposited in the mucous membrane of the nose, generally forms minute tumours, varying in size from a poppy to a hemp-seed; occasionally, however, large growths are formed, as in the cases reported by Riedel. The small tumours may be seen to be undergoing cheesy degeneration, and the mucous membrane covering them shows signs of softening, and commencing ulceration. In Laveran's cases, tubercles and giant cells were found in the sub-epithelial stratum forming the base of the ulcers, and also in the tissues immediately surrounding them. The large tumours observed by Riedel consisted in the main of very vascular granulation-tissue. Grey nodules could be seen with the naked eye, which, microscopically, were found to "consist of masses of large cells, the centres of which did not contain the giant cells so constantly met with in lupus."

In Tornwaldt's case the portion of growth first excised was examined by Farne, of Dantzig. The specimen contained distinct groups of small nucleated cells, with several larger epithelioid cells in a reticular stroma. In two preparations giant cells could be clearly demonstrated. Other portions of the growth subsequently removed were examined by Baumgarten, with the assistance of Neumann. The following is their report :—"We conjointly agree in stating that the specimen is, as you surmised, a tubercular node. In a tissue densely infiltrated with small round cells, circumscribed groups of larger epithelioid cells, containing in their centre (in scanty number, it is true) veritable giant cells, are seen. The limited amount of the specimen affords some ground of objection to our diagnosis of tubercle."

The most detailed account of the microscopic appearance of tubercle in the nasal mucous membrane has been given by Weichselbaum. He states that the peripheral parts of the nodules are composed of lymphoid cells, which form larger or smaller groups, and present an interstitial structure of reticular connective tissue. Gland-tubes of various shapes, cut transversely, obliquely, and longitudinally, are scattered here and there in the round-celled mass. These represent the acini and excretory ducts of the follicles separated by the lymphoid infiltration. The lumen of many of the ducts is encroached upon by "epithelia of low type," whilst some of them, on the other hand, are over-distended by the quantity of round cells within them. The nodule may contain giant cells with oval peripheral nuclei, and a fine granular centre can be made out, or it may be in a state of cheesy degeneration, consisting merely of granular *débris*, indistinct nuclei, and the remains of cells. The sub-epithelial layer of the mucous membrane in the neighbourhood of the nodules is densely infiltrated with lymphoid cells, the latter being clustered for the most part around the blood-vessels. The edges of the ulcers show an infiltration of round cells or of elements which in their form resemble endothelial cells, whilst the base of the ulcers is covered with a thick layer of finely granulated *detritus* (cheesy mass). Under this proliferating connective tissue endothelial cells are met with. The mucous follicles are seen undergoing two kinds of degeneration. In the one the lymphoid or endothelial elements invade the inter-acinous structure, encroach upon the acini, and ultimately destroy the entire gland, which, whilst retaining its shape, is transformed into a mass of cells; in the other the gland-cells are not merely pushed aside, but appear themselves to participate in the morbid process. The sub-epithelial layer of the mucous membrane, not only in the immediate vicinity of the ulcers, but also at some distance from them, shows round-celled infiltration.

Prognosis.—It is doubtful whether the disease can be eradicated when once deposit of tubercular matter has occurred. In Tornwaldt's case the wounds healed very rapidly after the removal of the tumours, but subsequently new granulations appeared.

Treatment.—If there be any troublesome discharge, mildly astringent or disinfectant collunaria should be used; and if tumours of any size cause serious inconvenience by interfering with nasal respiration, they may be removed. Should much pain be felt—which, however, is seldom the case—insufflations of morphia and bismuth would probably give relief.

LUPUS OF THE PITUITARY MEMBRANE.

Latin Eq.—Lupus membranæ pituitariæ.
French Eq.—Lupus de la membrane pituitaire.
German Eq.—Lupus der Membrana pituitaria.
Italian Eq.—Lupus della membrana pituitaria.

DEFINITION.—*A deposit of "granulation tissue," occurring primarily in the mucous membrane of the nasal fossæ, which slowly ulcerates.*

History.—A few cases of this rare complaint are found scattered through medical records, examples of the disease having been reported by Cazenave[1] and others. The disease was fully described by Hebra and Kaposi[2] in their systematic work on cutaneous affections, and afterwards by Moinel[3] in a short monograph.

---

[1] "Mém. sur le Coryza chronique." 1848.
[2] "Diseases of the Skin." Syd. Soc. Transl. London, 1875, vol. iv. pp. 65-68.
[3] "Essai sur le Lupus scrofuleux des Fosses nasales." Paris, 1877.

Etiology.—The causes producing lupus are quite unknown, but it generally occurs in young persons of strumous constitution, and the female sex is more liable to it than the male.

Symptoms.—Lupus, as is well known, generally first attacks the skin of the nose, but cases are occasionally met with in which the disease commences in the nasal mucous membrane, and sometimes it remains confined to that tissue. The malady may appear as lupus *exedens* or *non exedens*. The former variety usually begins on the cartilaginous septum, where small red excessively irritable tubercles are seen at an early period. In the next stage ulcers appear, which have a great tendency to spread, often eating away in their course the whole of the cartilaginous septum, the alar cartilages, and sometimes even portions of the bones themselves.

These ulcers are always covered with crusts, under which the process of destruction goes on in one part, whilst healing may be taking place in another. At the same time there is a foul discharge from the nose, which, though at first resembling that of common coryza, later on often assumes the character of virulent ozæna. In lupus non exedens there is no ulceration, but atrophic degeneration and shrinking of all the tissues affected, including the bones and cartilages, occur. A disagreeable odour is exhaled, as in the ulcerative form of the complaint.

Diagnosis.—Lupus is easy of recognition by a practitioner who has previously seen examples of the disease; the youth of the patient, the slowly destructive process, and the crusted ulcers showing a disposition to heal at certain parts, being eminently characteristic. The malady may be mistaken for a syphilitic affection, from which, however, it can generally be distinguished by the curative action of iodide of potassium in the latter disease; it must not be forgotten, however, that syphilis and lupus may coexist in the same patient. It is often extremely difficult, and sometimes impossible, to differentiate lupus in its early stage from epithelioma, but after a time the characteristic features of each affection become manifest.

Pathology.—The microscopic characters of lupus are, briefly, infiltration of the integument with small cells arranged in "nests," at first separate from each other, and at a later stage becoming confluent, so as to involve a considerable area; large numbers of cells are also heaped around the blood-vessels. Fatty degeneration of the cells next occurs and ulceration is produced. Micrococci have recently been discovered in parts affected with lupus by Max Schüller,[1] and it has been shown by him that the offshoots of the micrococci spread into the neighbouring connective tissue, the extremities of their root-like processes being covered with granules. These organisms are found in the walls of the small vessels surrounded by round and epithelioid cells.

Prognosis.—Lupus can sometimes be subdued by a well-directed course of treatment, but there is always a great tendency to relapse, and this is especially to be dreaded when the cicatrix remains indurated, and is of a red colour or covered with arborescent vessels. In some cases the disease shows a tendency to pass backwards and involve the pharynx, and this must be regarded as an unfavourable feature. As the patient gets older, the disease in many instances shows a tendency to spontaneous cure.

---

[1] "Centralblatt fur Chirurgie." 1881, No. xlvi.

Treatment.—The local measures to be adopted in cases where lupus attacks the inside of the nose, leaving the integuments unscathed, consist in destroying the diseased tissues by means of powerful caustics, such as nitric acid, caustic potash, or chloride of zinc, or by the use of galvano-cautery. All crusts should be cleared away before employing the caustic, the application of which generally has to be repeated several times. Care must be taken to destroy every portion of the affected part, as any place left uncauterized forms a starting-point for a fresh outbreak of the disease. Constitutional treatment is also of the greatest importance in lupus. Cod-liver oil and tonics, especially iron, are often useful. Hunt[1] maintained that arsenic is a specific in this complaint, and other practitioners have found this drug of service.

RHINOSCLEROMA.

This exceedingly rare disease was first described by Hebra[2] in 1870, and examples of it have since been published by Geber,[3] Tantuzzi,[4] Mikulicz,[5] Weinlechner,[6] Billroth,[7] and Cornil.[8] The subject has been fully treated by Kaposi,[9] Neumann,[10] and Pellizzari.[11]

Nothing is known as to the *causation* of the malady, neither sex, constitutional disease, nor personal habits appearing to have any definite influence in producing it. Most of the cases on record have occurred between the ages of fifteen and forty-five. The climate or conditions of life in the south-east of Europe would appear to predispose in some measure to the complaint, since of a total of about forty cases hitherto observed, all but three were met with in Vienna or its neighbourhood. Two of these occurred in Italy and one in France, but I am not aware of a single instance in which the disease has been noticed in any other country. Cases of "rhinoscleroma" are mentioned by Spillmann[1] as having been seen by Verneuil and others, but from the description of the complaint it was evidently merely perichondritis of the septum.

---

[1] "Brit. Med. Journ." 1862, vol. i. p. 8.

[2] "Wien. med. Wochenschr." January, 1870.

[3] "Archiv. f. Dermatol. u. Syph." 4 Heft, 1872.

[4] "Il Morgagni," 1872.

[5] "Langenbeck's Archiv." Bd. xx.

[6] Quoted by Neumann, op. infra cit. p. 567.

[7] Quoted by Kaposi, op. infra cit. p. 635.

[8] "Progrés Médical." July 28, 1883, p. 587.

[9] "Pathologie u. Therapie der Hautkrankheiten." Zweite Auflage, Wien u. Leipzig, 1883. Zweite Halfte, pp. 632-637.

[10] "Lehrbuch der Hautkrankheiten." Fünfte Auflage. Wien. 1880, pp. 566-569.

[11] "Il Rinoscleroma." Firenze, 1883.

Rhinoscleroma shows itself generally at the edges of the nostril and on the neighbouring part of the upper lip, in the form of flat, slightly raised patches which are smooth on the surface, and of ivory-like hardness. The integument over them is natural, or sometimes dusky red in hue, but round the patches it is neither thickened nor discoloured. The swellings are tender on pressure, but otherwise the disease is unattended with pain. The patches may be discrete or confluent, and the disease spreads by gradual infiltration of the surrounding tissues. There is seldom any sign of ulceration, and the growth does not take on increased activity when interfered with. Although the disorder may appear in two or more places simultaneously, or successively, it shows no tendency to generalize itself, either by the blood-vessels or the lymphatics, and there is never any sign of constitutional infection. Its course is very slow, and the patient experiences nothing beyond purely local symptoms. The swelling may involve the septum and the alæ of the nose, so as to make that feature feel as if it were "made of plaster of Paris," and it may invade the upper lip, spreading afterwards to the gums and the alveoli. The morbid process occasionally extends back through the nose to the throat as far as the larynx and trachea, or through the mouth to the velum. In each case certain symptoms will be manifested, such as obstruction of the nose, aphonia, or stenosis of the glottis. Rhinoscleroma has to be *distinguished* from syphilis, epithelial cancer, and keloid. It differs from venereal disease mainly in its very chronic course, the absence of softening or ulceration, and its absolute intractability under every kind of medication. From epithelioma, again, it can be discriminated by its smooth glistening surface, its hardness, the absence of bleeding or ulceration, and its persistently *local* character. The history and progress of the case can alone differentiate rhinoscleroma from keloid in many instances.

---

[1] "Dict. Encyclop. des Sci. Médicales," art. "Nez," t. xiii. pp. 15, 16.

The *prognosis* is most unfavourable as regards cure, recurrence of the growth taking place even after complete removal. The disease, however, does not tend to shorten life, unless it spreads down to the larynx.

Pathologically, the growth is allied to round-celled sarcoma, the essential feature of rhinoscleroma, according to Kaposi,[1] being infiltration of the corium and papillæ with small cells.

This observation is confirmed by Cornil, who, moreover, states that, scattered about among the vessels, there are large spheroidal cells containing one or more nuclei. These are imbedded in a reticular protoplasm, and in this there are also small refracting hyaline bodies, which finally, in the course of development of the cell, fill its whole cavity. These hyaline bodies in some cases pass out of the body of their parent cell into the surrounding tissue. They are not of amyloid or fatty nature, and, according to Cornil, do not contain micrococci. They constitute the distinctive pathological product of rhinoscleroma. True cartilage was found in one instance by Kaposi,[2] and in Chiari's[3] case there was not merely cartilage but commencing ossification.

Medical *treatment* has no effect on the disease, and surgery can do nothing but palliate the more troublesome symptoms. The knife and various caustic agents have been freely employed without success, for, as already remarked, the most complete removal or destruction of the morbid formation has always been followed by recurrence of the disease. Temporary good can, however, often be done. If the nose becomes blocked up, the obstructing growth should be removed or destroyed with the cautery, and the narrowed passage dilated by means of laminaria tents. In threatened suffocation from invasion of the larynx, tracheotomy must of course be performed without delay.

GLANDERS.

Latin Eq.—Equinia; Malleus humidus.
French Eq.—Morve.
German Eq.—Rotz.
Italian Eq.—Ciamorro.

DEFINITION.—*A contagious disease generated by the introduction into the system of a specific poison derived directly or*

---

[1] Op. cit. p. 635. [2] Op. cit. p. 635. [3] Ibid.

indirectly from a horse suffering from the same affection, characterized by the formation of pustules, followed by spreading ulceration of the skin in various parts of the body (farcy) and of the mucous membrane of the nose and throat, from which a viscid, muco-purulent or sanious secretion is discharged in great abundance; accompanied by the usual constitutional symptoms of blood-poisoning, and ending generally in death.

History.—The earliest actual observation of the occurrence of glanders in man was made in 1783 by Osiander,[1] whilst it was not till 1812 that farcy was described by Lorin,[2] as affecting the human subject. The first detailed account of the whole malady was published by Schilling[3] in 1821. Five years later, three instances of the disease were recorded by Travers,[4] who, however, does not appear to have understood the true nature of the phenomena which he observed. A fatal case of glanders in man was related by Brown[5] in 1829. In the two or three following years the affection was investigated by Elliotson,[6] who, in a series of papers constituting a short monograph on the subject, described several cases which he had himself met with, in addition to a few which he had been able to collect from other sources. Shortly afterwards two examples of glanders and farcy in the human subject were published by Graves,[7] who claims to have been the first to call attention to the occurrence of "button-farcy" in man.[8] In 1837 appeared the elaborate report of Rayer,[9] which had a great effect in inducing the establishment of strict sanitary regulations as to infected horses. In 1843 Tardieu[10] published his well-known essay on glanders and farcy. In more recent times, considerable attention was given to the subject by Virchow,[11] and an excellent account of the disease was published by the brothers Gamgee[12] in 1866; since then elaborate articles dealing with human glanders and farcy in the fullest manner have been published by Bollinger[13] and Brouardel.[14] Quite recently the pathology of the disease has been carefully investigated by Bendall[15] and Boyd,[16] whilst bacilli have been discovered almost simultaneously by several French and German observers (see Pathology).

---

[1] "Ausfürliche Abhandlung über die Kuhpocken." 1801.

[2] "Journ. de Méd. Chir et Pharm. Milit." Février, 1812.

[3] "Rust's Magazin f. d. gesammte Heilkunde.' Berlin, 1821, vol. xi. p. 480.

[4] "Inquiry concerning Constitutional Irritation." London, 1826, p. 350, et seq.

[5] "London Med. Gaz." 1829, vol. iv. p. 134.

[6] "Med.-Chir. Trans." London, 1830, vol. xvi. pt. i. p. 171. Ibid. 1833, vol. xviii. pt. i. p. 201. Ibid. vol. xix. p. 237.

[7] "London Med. Gaz." vol. xix. p. 939.

[8] "Clinical Lectures." Dublin, 1848, 2nd ed. vol. ii. p. 336.

[9] Mém de l'Acad. de Méd." Paris, 1837, t. vi.

[10] "De la Morve et du Farcin chroniques chez l'Homme et les Solipèdes." Thèse de Paris, No. 15, 1843.

[11] "Die Krankhaften Geschwülste." Berlin, 1864-65, vol. ii. p. 543, et seq.

[12] "Reynolds's System of Medicine." London, 1866, vol. i. p. 693, et seq.

[13] "Ziemssen's Cyclopædia of Médicine." English Transl. 1875, vol. iii. p. 348, et seq.

[14] "Dict. Encyclop. des Sciences Médicales." Art. "Morve." Paris, 1876. 2e série, t. x. p. 166, et seq.

[15] "Trans. Path. Soc." 1882, vol. xxxiii. p. 417, et seq.

[16] Ibid. p. 420, et seq.

Etiology.—There can be no controversy as to the cause of this rare disease in the human subject, although there may be some difference of opinion as to the conditions necessary for its production. The complaint as it affects the *horse* is seen under two forms, viz., farcy and glanders. The former is characterized by inflammation along the course of the lymphatic vessels, leading to painful swelling of the glands, which suppurate, and after a time burst, giving rise to ulcers secreting a virulent discharge. Glanders, on the other hand, shows itself by the deposit of small nodular growths in the nasal fossæ, accompanied by ulceration of the mucous membrane, and by a discharge from one or both nostrils, at first very thin, but quickly becoming thick, viscous, and foul-smelling. Both farcy and glanders appear under the types of acute or chronic ailments; but there is this remarkable feature about each, that whilst an animal may be suddenly attacked by either disease in its acute form, the chronic malady is never found as a consequence of the acute stage, but on the contrary very often precedes it. Farcy and glanders frequently coexist, or the one complaint may follow the other. Their identity is further proved by the fact that whilst the discharge from the nostrils of a glandered horse may produce an attack of farcy in another animal, on the other hand, the inoculation of matter from "farcy-buds" may give rise to glanders.

Both forms of the complaint are met with in *man*, but the affection is so uncommon that very few physicians have ever had an opportunity of observing it. Taking into account the vast number of persons whose business or pleasure brings them much in contact with horses, and the comparative frequency of the equine disease, the extremely rare occurrence of glanders or farcy in the human subject seems to show that some special predisposition is necessary for the poison to be effective. As might be expected, the great bulk of sufferers belong to the class of veterinary surgeons, grooms, coachmen, and others whose occupation requires much handling of horses. From a table drawn up by Bollinger[1] it appears that out of one hundred and six cases of glanders, in forty-one the patients were ostlers, in eleven coachmen, in fourteen landed proprietors owning horses, in ten veterinary surgeons, in twelve horse-butchers, in five soldiers, in four surgeons, in three gardeners, and in two horse-dealers. Of the remaining four patients, one was a policeman, one a shepherd, one a blacksmith, and one a servant at a veterinary school. Men, being more exposed to infection, are of course much more liable to the disease than women. In 120 cases Bollinger[1] found only six females, and these were mostly wives or relatives of men whose employment lay among horses.

---

[1] "Ziemssen's Cyclopædia of Medicine." English Transl. 1875, vol. iii. p. 352.

The most common mode of transmission of the malady is by inoculation—that is to say, by the actual contact of discharge from the nostrils of a glandered horse, or of pus from a farcy-abscess, with a wound or abrasion in the skin or mucous membrane. In a fatal case which occurred in my practice some years ago, the source of infection was traced to a diseased horse in a hansom cab. The patient, who had only driven a short distance, noticed that the animal sneezed, and he was annoyed by some of the secretion coming on his face. The infection may be carried by rags used to clean out the nasal fossæ of a diseased animal, or by anything on which the discharges have fallen. One case[2] is on record of the complaint having been communicated by biting, the poison having presumably been carried in the saliva. The disease may be transmitted in its worst form from man to man. There is some doubt whether the poison can be conveyed into the system through the stomach, Decroix's[3] foolhardy and disgusting experiments having yielded negative results.

Symptoms.—Although, as already stated, glanders and farcy are merely different expressions of the same morbid condition, it does not fall within the scope of this work to deal in detail with the latter complaint. As a matter of fact, moreover, the lymphatic system is much less often directly attacked by the poison in man than in the horse.

Glanders, as already remarked, may be either chronic or acute, and it will be convenient to consider the former type of the complaint first, as in the natural evolution of the disease it often precedes the latter. There is usually but little swelling or redness to be seen in the nasal fossæ, and often no discharge, but the mucous membrane is covered with dirty scabs, and ulcerated in several places. The mouth and throat are also affected, although not often to any great degree. The breaking down of the nodules, however, may give rise to ulceration of the tongue, back of the throat, and larynx, and huskiness of voice, slight cough, and even some trouble in breathing may ensue. The expectoration is occasionally bloodstained. The complaint runs a very chronic course, lasting, as a rule, from four to eight months, but often much longer. Bollinger[1] relates a case in which traces of the disorder, such as cough, dyspnœa, and great prostration, remained after eleven years of suffering. The proportion of recoveries is stated by the same author to be about fifty per cent., but a considerable number of those that are said to be cured are never restored to perfect health. Of the cases that end fatally, in some, death is caused by the exhaustion of the slow fever, with its accompanying night-sweats and diarrhœa, and the septic effect of prolonged suppuration, whilst in the remainder the malady suddenly takes on the acute character.

---

[1] Op. cit. p. 352.

[2] Landouzy: "Gaz. Méd." 1844, p. 460.

[3] "Bull. de la Soc. Cent. de Méd. Vét.," 1870-71. This ardent seeker after truth devoured the flesh of diseased horses, both raw and cooked in various ways, and no unpleasant consequences appear to have ensued.

The acute form of the disease is almost always fatal, whether it follows chronic glanders or farcy, or comes on as the immediate result of inoculation. Its onset is marked by shivering, sudden rise of temperature, and the usual symptoms of high fever; an erysipelatous rash shows itself on the face, beginning, in most cases, in the nose, but soon spreading over the cheeks and forehead. The surface of the inflamed skin becomes covered with vesicles, which by-and-by burst, and discharge a thin serous fluid, whilst patches of the integument may even show signs of imminent gangrene. The characteristic glander-pustules appear in crops on the face, intermingled with blebs. The secretion from the pustules soon dries up, and forms a scab, and when this separates, an ulcerated surface remains, which tends to spread on all sides, often with almost phagedænic rapidity. The patient at the same time is afflicted with a painful sense of obstruction in his throat and nasal passages. This is due to the mucous membrane of those parts being thickly studded with pustules. A glairy liquid constantly flows from the nose, and is hawked up from the throat, and there is often a similar secretion from the eyes. As the disease progresses the discharge becomes thicker and more glutinous; it is often streaked with blood, and always very fetid. Occasionally there are sickness, diarrhœa, and abdominal pains. It should be borne in mind, however, that the discharge may be very scanty or, indeed, altogether wanting. When the disease is fully established the voice grows hoarse or may be entirely lost; whilst difficulty of swallowing is induced by swelling of the epiglottis. The expectoration generally becomes more abundant and more bloody as the disorder pursues its course in the larynx, Paroxysms of dyspnœa ensue from the partial obstruction of the glottis, and the patient gets delirious or falls into the so-called "typhoid" condition, which gradually passes into coma and death. The acute stage of glanders following the chronic form is much more speedily fatal than when it occurs independently, for whilst in the latter case the disease may last for twenty days or more, in the former death usually puts an end to the patient's sufferings in less than a week.

---

[1] Op. cit. p. 350.

Diagnosis.—This malady probably sometimes escapes recognition, for unless there be a clear history of inoculation, the practitioner is not likely to think of so rare a disease as glanders. In all instances, therefore, of nasal obstruction and discharge, especially if accompanied by marked derangement of the system, pains in the limbs, and abscesses in various parts of the body, the history of the patient should be carefully inquired into, particularly as regards his occupation and habits. It is only from a broad view of the circumstances that a correct opinion can be arrived at in cases that are at all doubtful. The pustules and ulcers have nothing absolutely distinctive in themselves, and the general symptoms of both glanders and farcy bear a strong resemblance to the salient features of many other more common affections. Thus the pains about the joints which are met with in farcy are suggestive of rheumatism, until a minute examination reveals that it is not the articulation itself that is complained of, but the muscles and tendons surrounding it. The rigors and abscesses will probably lead the practitioner to suspect pyæmia, especially if there be a history of a dissecting wound; it should be remembered, therefore, that shivering is a much less marked feature in farcy than it is in pyæmia, and that in many instances this symptom is altogether absent. When the complaint is accompanied, as it not unfrequently is, by gastro-intestinal disturbance, it may simulate typhoid fever very closely, but the absence of the rose-coloured spots and of the characteristic wave-like rise in temperature will serve to distinguish it from that disorder. Glanders is particularly likely to be mistaken for venereal disease of the nose and throat, but the great amount of constitutional disturbance in the former complaint, and the favourable action of iodide of potassium in the latter, afford ample grounds of distinction. From scrofulous eruptions and ulcers about the face and within the nose the disorder can likewise be distinguished by the severity of the constitutional symptoms which accompany it. With every possible precaution, however, a certain diagnosis cannot always be arrived at, and a striking example of the difficulties surrounding the practitioner who has to deal with this obscure disease is related by Virchow,[1] who records a case in which the autopsy on a patient, whose complaint had not been recognized during life, led to the discovery of a severe epizoötic of the malady among horses which had been previously overlooked.

Pathology.—The disease is of the same pathological type as syphilis and tuberculosis, and it bears a close resemblance to pyæmia. The morbid process exhibits the ordinary sequence of phenomena due to blood-poisoning, viz., infection through broken skin or mucous membrane, inflammation of the lymphatic vessels connected with the point of entrance of the virus, swelling and suppuration of the related lymphatic glands, and gradual generalization of the disease through the entire system. The specific morbid product, if such it can be called, of glanders is a nodule or tubercle, deposited on the skin and mucous membrane in some part of the body, notably on the face, limbs, and walls of the nasal passages. These nodules are usually not much larger than a grain of hemp-seed, and they may be scattered about, or grouped together in clusters. They are at first almost colourless, but, rapidly increasing in size, they become first red, and then gradually yellowish in hue, and acquire all the characters of pustules. On microscopic section, these bodies are found to consist of pus cells and numerous small nuclei densely packed together: and, quite recently, rod-shaped bacteria, somewhat resembling tubercle-bacilli, have been detected in the pustules and ulcers of men and animals suffering from glanders, by Schütz and Löffler[2] in Germany, and almost at the same time by Bouchard,[3] Capitan,[4] and Charous[5] in France. The nodules show a marked tendency to break down and become converted into small abscesses. These in many cases burst, and a foul sore with irregular edges is produced, which has little or no disposition to heal, and in the acute form of the malady may even spread to the neighbouring parts of the skin, or, penetrating deeply through the underlying tissues, may reach the skeleton.

---

[1] "Die Krankhaften Geschwülste." Berlin. 1864–5, vol. ii. p. 554.

[2] "Deutsche med. Wochenschr." 1882, No. 52.

[3] "Revue Méd. Française." Dec. 30, 1882.

[4] Ibid.

[5] Ibid.

Prognosis.—Acute glanders is almost invariably fatal, but a few cases of recovery have been recorded.[1] In the chronic disease the prospects of the patient are less gloomy as regards the immediate issue, but the malady leaves ineffaceable marks of its presence, and complete restoration to health can hardly ever be looked for. As to the disease in general, perhaps the best practical guide for the physician in forecasting the result of a case is to be found in the rule laid down by Brouardel,[2] that so long as the *nose* is not affected there is still room for hope.

Treatment.—The treatment of glanders, when once the system has been impregnated with the poison, is confessed by all writers on the subject to be almost utterly ineffectual. Certain general principles must, of course, be adhered to, such as carefully attending to all the symptoms as they are developed, and watching the constitutional condition of the patient, so as to give stimulants when the strength begins to flag, anodynes or sedatives if there be pain, excitement, or sleeplessness. Emetics and purgatives have been recommended, but the former should never be given, and the latter only when clearly indicated. Various preparations of iodine and sulphur have been at different times proposed as specific remedies, and recoveries have been attributed to the use of each of those drugs.[3]

Certain local remedies should not be neglected, as, even if they fail to prolong the patient's life, they may lessen his suffering, and, what is also of importance, diminish the risk of this loathsome disease being conveyed to his attendants. Elliotson[4] states that he succeeded in stopping the discharge from the nose by injecting a solution of two grains of creasote in a pint of water three times a day. Ulcerated surfaces should be frequently dressed with lint steeped in carbolic acid solution (1 in 60 or 80).

It need hardly be added that the most vigorous prophylactic measures should be carried out wherever the disease is found to exist. In the case of horses this is enforced by legal enactment, and though the malady is less likely to be communicated by man to man, the utmost care should always be taken to destroy or disinfect anything by which the virus may be conveyed. According to the experiments of Gerlach,[1] carbolic acid destroys the activity of the poison, and any one who is in attendance on a case of glanders, whether in man or beast, should on no account neglect to wash his hands and instruments in a strong solution of this antiseptic agent after every dressing.

---

[1] Brouardel, op. cit. p. 181 : Harrison, "Lancet," vol. ii. 1872, p. 910 : Haynes Walton, "Med. Times and Gaz." 1877, vol. ii. p. 13.

[2] Op. cit. p. 191.

[3] See Brouardel : op. cit. p. 202.

[4] Loc. cit.

An interesting observation has lately been published by Meyrick[2] which tends to show that (as might be expected) the virus becomes attenuated by long exposure to the air, and that animals inoculated with this milder poison suffer from a modified form of the disease. A cavalry party was picketed on a sandy plain in the neighbourhood of Cairo, *near to* a spot which had been occupied some months before by a detachment of Indian cavalry, whose horses had suffered severely from glanders. Two horses belonging to the former contracted glanders, and several others had swelling of the submaxillary glands and vesicles on the Schneiderian membrane, which burst, but healed quickly without ulceration. The important question to be decided now is whether the inoculation of virus, weakened by proper cultivation, would act as a preservative against the effects of glanders-poison in its more active form. On this point there is not yet, so far as I am aware, any evidence whatever.

AFFECTIONS OF THE NOSE IN ERUPTIVE FEVERS, AND OTHER ACUTE DISEASES.

Measles.—In measles, serous flux from the nose, with congestion of the conjunctiva, is one of the earliest symptoms. Occasionally this is followed by severe rhinitis, and in these cases epistaxis not unfrequently occurs. If these acute symptoms subside, and the patient recovers, dry catarrh and ozæna sometimes remain behind. Ulceration of the septum has also been observed.[3]

Scarlet Fever.—In *scarlatina anginosa* the nasal mucous membrane is often involved. The affection may be of merely catarrhal character, or, on the other hand, the inflammation may be very severe, and accompanied by great swelling of the mucous membrane and an abundant irritating discharge. Ulceration sometimes takes place, and this may be followed by epistaxis.

---

[1] Quoted by Bollinger, op. cit. p. 370.

[2] "Veterinary Journal," 1883, vol. xvii. p. 179.

[3] Joffroy: "Bull. de la Soc. Anat." 1870, p. 164. Also Dechant: "De la Rougeole." Thèse de Paris, 1842, p. 24.

Small Pox.—In this disease, especially in the confluent variety, pustules occasionally form inside the nose, causing obstruction of the passage, and in certain cases producing epistaxis. Complete obliteration of one or both nostrils has more than once resulted from the union of the opposite raw surfaces of the outer and inner walls of the nostril when the scabs have come away. An instance of this kind has been recorded by Luc,[1] who succeeded in remedying the condition by incising the nostril and afterwards keeping it open by dilatation.

Typhoid Fever.—In all adynamic fevers it is well known that there is a tendency to acute inflammation of tissue, with formation of abscesses. The influence of position, which in typhoid fever is so largely concerned in the production of throat affections, does not come into operation in the case of the nose, but changes are apt to occur in the mucous membrane from the drying of masses of mucus within the nasal fossæ. The ulcers thus formed often spread, and necrosis of the septum may take place, resulting finally in perforation. Cases due to long and exhausting fever have been observed by Roger,[2] Lecœur,[3] Gietl,[4] Lagneau,[5] and Charcot.[6]

Rheumatism.—In rheumatic fever, severe inflammation and ulceration of the pituitary membrane sometimes occur, and even necrosis of the cartilaginous portion of the septum has been noticed. An instance of this kind has been related by Roger,[7] in which a young man suffering from very severe rheumatism, with well-marked cardiac complications, lost a portion of his septal cartilage of about the size of a grain of rice two months before his death. A somewhat similar case has also been reported by Corbel.[8]

---

[1] Quoted by Casabianca: "Des Affections de la Cloison des Fosses nasales." Paris, 1876, p. 17.

[2] "Gazette des Hôpitaux." 1860, p. 153.

[3] Ibid. p. 214.

[4] "Union Médicale." 1862, t. xvi. p. 523.

[5] "Gazette Hebdom." 1863, p. 110.

[6] Quoted by Casabianca, op. cit. p. 33.

[7] "Union Médicale." 1860, nouvelle série, t. v. p. 168.

[8] "Gazette des Hôpitaux." 1860, p. 178.

Influenza.—It has not appeared to me desirable to treat influenza in a separate article, as the symptoms affecting the bronchial tubes and the lungs are so much more important than those which manifest themselves in the nose. It must not be forgotten, however, that the latter are the first to attract attention.

Nasal Diphtheria.—This affection has already been fully considered (Vol. i. p. 185).

FRACTURES OF THE NOSE.

Latin Eq.—Fractura ossium nasi.
French Eq.—Fracture des os du nez.
German Eq.—Fractur der Nasenknochen.
Italian Eq.—Frattura delle ossa del naso.

Definition.—*Fractures of the bones or cartilages of the nose, often compound, either from a wound in the skin, or from laceration of the mucous membrane, generally accompanied by considerable contusion and some displacement.*

History.—Fracture of the nasal bones has been familiar to practitioners from the earliest times of surgery. Hippocrates[1] discusses such injuries at some length, and the methods of treatment which he recommends shows that he must have had a large experience of broken noses; and when it is remembered that he practised among a people who held boxing in high esteem, this is hardly to be wondered at. Hippocrates mentions that fractures of the nose were done up in such an elaborate way that every young surgeon was anxious to meet with an example of the injury, in order that he might have an opportunity of showing his skill in bandaging. It may be remarked in connection with this subject that Hippocrates recommends the application of shreds of linen steeped in white of egg as the best means of keeping the bones in place—a remarkable anticipation of the starch bandage of modern days. In the sixteenth century Ambrose Paré[2] strictly followed Hippocrates in his mode of treatment. In modern times, Jarjavay[3] has written at some length on certain sequelæ of fracture of the nose; and William Adams[4] has published some important improvements in the mode of treating the injury, especially as regards the avoidance of subsequent deformity.

Etiology.—Owing to the arched form of the nasal bones, and their sheltered position between the prominence of the *os frontis* and the cartilaginous tip of the nose, they are seldom broken, except when a person falls against a sharp corner, such as the edge of a step or a table, or the angle of a wall, or when an angular body, such as the knuckles of a man's fist, or the iron shoe of a horse, is driven violently against the nose. The nasal bones are, however, liable to be fractured by blows which fall on them sideways. In such cases both bones are usually broken transversely, the lower fragments being dislocated towards the opposite side to that on which the blow is received. Falls on the head sometimes produce fractures of the roof of the nose, *i.e.* of the ethmoid bone, but in these cases the injury of the base of the skull is, of course, very much more important than that of the nose. On the other hand, it has been found experimentally by Hamilton,[1] that direct injury to the septum will not cause fracture of the cribriform plate. The nose would, however, be much more liable to fracture were it not for the yielding character of the cartilage, on which blows mostly fall, breaking the shock in great measure. Gurlt[2] found that out of a total of 225 fractures of the bones of the head, there were twenty-two of the nose, seventeen of the upper jaw and zygoma, and fifty-six of the lower jaw; whilst Otto Weber,[3] in fifty-six fractures of the cranial bones, met with ten of the nose, four of the upper jaw and zygoma, and nine of the lower jaw.

---

[1] "De Artubus." Paris, 1884. Littré's edition, vol. iv. p. 159.
[2] "Œuvres," livr. 8, ch. xxvi. Paris, 1840. Malgaigne's edition, vol. ii. p. 86.
[3] "Bull. Général de Thérap." 1867, t. lxii. p. 539, et seq.
[4] "Brit. Med. Journ." 1875, vol. ii. pp. 421, 422.

It is possible that the delicate skeleton of an infant's nose may be irretrievably damaged by the blades of the forceps in childbirth, but I am not aware of any actually recorded case of this accident, except the somewhat questionable one of Tristram Shandy. Fibrous and malignant tumours of the nasal fossæ or the neighbouring parts sometimes produce fracture of the bony roof or parietes of the nose, but more often the pressure of such growths causes absorption of the bone.

Symptoms.—The injury varies from a simple fracture without displacement to complete crushing of the nasal arch. A case has come under my notice in which the wheel of a tramcar passed over the face of a gentleman, completely crushing his nose, but doing him very little damage otherwise. The disfigurement, however, was so great that the patient had to retire from his profession. In another instance with which I am acquainted the bony part of the nose was crushed flat by a fall, leaving an ugly knob corresponding to what had been the tip of a very shapely feature, and giving the whole face a markedly simian expression. The sufferer, a highly popular abbé, had to hide his disfigurement in a monastery. Even in the slighter forms of injury there is ordinarily great swelling of the soft parts, with widespread ecchymosis and œdema of the eyelids and cheeks. There is always some epistaxis,[1] and occasionally, when the mucous membrane has been torn, emphysema occurs. This usually follows the accident on violent sneezing or blowing of the nose, and, although very alarming to the patient, is of no importance. In order to make a satisfactory examination, the patient should be fully anæsthetized, when the nature of the injury will, as a rule, be ascertained, although it is in most cases difficult to detect crepitus. By passing a small probe up the nose with one hand, whilst with the other the parts are gently manipulated externally, any displacement will generally be discovered. Hamilton[2] judiciously points out that a *small probe* is much more useful than a catheter, which is usually recommended, and which, from its size, often cannot be passed, even when force is used. The sense of smell is frequently impaired, and sometimes even destroyed, from injury to the terminal twigs of the olfactory nerves.

---

[1] "Practical Treatise on Fractures and Dislocations." Philadelphia, 1866, 3rd ed. p. 93.

[2] "Handbuch der Lehre von den Knochenbrüchen." Hanover, 1864, vol. ii. p. 499.

[3] Op. cit. p. 179.

Diagnosis.—If the directions already given be followed (see Symptoms), the nature of the accident will in most cases be recognized without much difficulty.

Pathology.—The only special point that need be referred to in connection with the pathology is the remarkable disposition to rapid union in fracture of the bones of the nose. This peculiarity attracted the attention of Hippocrates,[3] and it is now recognized as being due to the extraordinary plastic power of the bones in the upper part of the face, a property which has been taken advantage of in the "osteoplastic operations" of Langenbeck, Ollier, and others, hereafter detailed.

Prognosis.—The greatest disfigurement may always be anticipated if the accident be not properly treated, and this may have the most serious results as regards the patient's future career. It must not be forgotten that such injuries may also be attended with danger to life. Gurlt[1] has shown that in cases in which at the time of the accident there was no evidence of injury to the brain, cerebral symptoms have afterwards come on. Out of fourteen examples of fracture of the nose collected by Weber[2] in the Bonn Clinic, there were four in which there was concussion of the brain, one of them terminating fatally.

---

[1] One fatal case of hæmorrhage was observed by Rossi. Quoted by O. Weber in v. Pitha und Billroth's "Handbuch der Chirurgie." Bd. iii. 1 Abtheil. 2 Heft. Erlangen, 1866, p. 181. Another was recorded by West ("Lancet," 1862, vol. i. p. 660). Bleeding recurred again and again, and the patient, a man aged sixty, died exhausted on the twenty-third day after the injury.

[2] Op. cit.

[3] Op. cit. p. 167.

Treatment.—The rapid union which takes place after fractures of the nose just referred to, though a highly conservative process, makes it of the utmost importance that the condition should be discovered in time to avoid deformity from improper union. As the tissues covering the broken bones are usually much contused, the first thing to be done is to attempt to disperse the swelling by means of evaporating lotions or other cold applications. The fragments should then be, as far as possible, replaced. This can generally be done by means of a pair of fine dressing-forceps or a female catheter introduced within the nose, combined with manipulation with the fingers of the left hand on the outside. Once restored to their proper position the fragments show little tendency to separate, for, as pointed out by Holmes Coote,[3] they are not acted on by any muscles. There is seldom, therefore, any necessity for splints or other supporting apparatus, which are, moreover, as a rule, intolerably irksome to the patient. If, however, the *septum* has been fractured, and displacement has been produced, Adams[4] advises that the fragments should be forcibly restored to their proper position with forceps, and retained *in situ* by means of a special splint and truss (p. 282). Jurasz's ingenious modification of Adams's instrument (see p. 282), which combines both forceps and splints, may also be advantageously used for the same purpose. Mason[5] has recently described a new method of treating fractures of the nose where the nasal processes of the superior maxillary bone are involved, and where, consequently, there is marked depression of the fragments. After reduction a needle is passed through the skin *behind* the fragment and brought out through the skin on the other side of the nose. A narrow band of india-rubber is fastened over each end of the needle, so as to make gentle pressure on the sides of the nose. This makes a firm support for the broken piece, preventing it from becoming depressed. Evaporating lotions or other dressings can be easily applied without disturbing the apparatus. The needles are to be removed from the sixth to the tenth day. Mason says that the wounds produced by the needle are quite insignificant. The plan appears to have been tried in only one case as yet, but the result was very encouraging.

---

[1] Op. cit. p. 240.

[2] V. Pitha und Billroth's "Handbuch der Chirurgie." Bd. iii. 1 Abtheil. 2 Heft. Erlangen, 1866, p. 181.

[3] "Holmes's System of Surgery." 2nd ed. 1870, vol. ii. p. 427.

[4] Loc. cit.

[5] "Annals Anat. and Surg. Soc. Brooklyn." New York, 1880, vol. ii. p. 107, et seq., and pp. 197–199.

DISLOCATION OF THE NASAL BONES.

Separation of the nasal bones from the frontal bone, or from the nasal process of the superior maxillary, is so rare that its occurrence has been denied. Benjamin Bell[1] states that "instances of it are sometimes met with," but without furnishing any details. Malgaigne,[2] however, gives the particulars of a case in which the existence of luxation of the nasal bones was established as certainly as any form of injury can be made out by touch and appearance without actual dissection. A man in falling struck the left side of his nose with great violence against the edge of the pavement. On examination, shortly after the accident, the upper third of the nose was seen to be deflected towards the right side, the lower part preserving its normal direction. The lower edge of the right nasal bone projected over its corresponding cartilage, whilst on the left side the inner edge of the nasal process of the superior maxillary stood out in sharp relief from the depression of the left nasal bone, a gap being evident between the upper edge of this latter and the frontal bone. There was no fracture. It is evident from this description that whilst on the right side the nasal bone was only separated along its lower edge, there was complete luxation of the corresponding bone on the left side, where the blow had been received.

In a case recorded by Longuet,[3] in which a soldier received a very heavy blow near the inner angle of the right eye, the upper part of the nasal bones appeared to have been pushed over bodily towards the left side, the septal cartilage, however, remaining in its normal position. The edge of the nasal bone could be plainly felt overriding the nasal process of the upper jaw on one side, whilst on the other the corresponding edges were visibly separated by a groove wide enough to admit the thumb-nail.

---

[1] "System of Surgery." Edinburgh. 1788, vol. vi. p. 184.

[2] "Revue Méd.-Chir. de Paris." 1851, t. x. p. 82.

[3] "Recueil de Mémoires de Méd. de Chir. et de Phar. Milit." t. xxxvii. 3e fascicule. May—June, 1881, No. 202, p. 284.

It will be observed that the mode of production of the injury is almost identical in these two cases, viz., a violent blow striking the nose sideways. It was only in this manner, also, that Longuet was able to produce luxation of the nasal bones in several experiments which he made on the dead body. The nasal bones may also be pushed asunder by a fibrous or sarcomatous mass, giving rise to the unsightly "frog-face" hereafter described. (See "Fibrous Polypi of the Naso-Pharynx.") The *symptoms* in the two cases related above were very much alike, consisting in epistaxis, swelling, tenderness, and a characteristic deformity. *Reduction*, which in Longuet's case was exceedingly difficult, and only partially successful, is best accomplished by combined manipulation of the displaced bones from the interior of the nose and the outside. As the pain of the operation is very great, it is desirable to anæsthetize the patient before the reduction is commenced.

DEVIATION OF THE NASAL SEPTUM.

Latin Eq.—Incurvatio septi narium.
French Eq.—Déviation de la cloison du nez.
German Eq.—Verbiegung der Nasenscheidewand.
Italian Eq.—Deviazione del setto nasale.

History.—More than a century ago, a short monograph was published by Quelmalz[1] on curvature of the nasal septum, which he appears to have considered as resulting in nearly all cases from injury or disease. Later on, Morgagni,[2] who claims to have given special attention to this matter, was disposed to attribute the condition to too rapid growth of the septum in proportion to that of the upper jaw. Soon afterwards, Haller[3] pointed out the frequent occurrence of this deformity, which he thought rendered the subjects of it more liable to catarrh than other people. The subject was briefly referred to by

---

[1] "De narium, earumque septi, incurvatione." Lipsiæ, 1750.

[2] "De sed. et caus. morb." Lugd. Batav. 1767, epist. xiv. art. 16; vol. i. p. 207.

[3] "Elem. physiol. corp. human." Lausannæ, 1769, t. v. p. 138.

Hildebrandt,[1] and again by Velpeau.[2] In 1851 Chassaignac[3] dealt with deviation of the septum in its cartilaginous portion, and described a method by which he succeeded in correcting the deformity. Another plan of procedure was tried by Blandin,[4] and an operation has been devised by Adams,[5] and improved by Jurasz,[6] for which excellent results are claimed. Theile[7] seems to have been the first who attempted a numerical estimate of the frequency with which asymmetry of the nasal septum is found in the dry skull, a matter which has recently received further illustration at the hands of Semeleder,[8] Sappey,[9] Harrison Allen,[10] and Zuckerkandl,[11] and a highly scientific anatomical work has been recently published on the subject by Welcker.[12] Löwenberg[13] has lately written a suggestive paper on these deviations, and their influence on the condition of the singing voice has been pointed out by Walsham.[14]

Etiology.—An asymmetrical position of the septum is very common. Numerical observations as regards the frequency have at present only been made on dried specimens, in which the cartilage is very seldom present. In 117 skulls Theile found deviation in 73·5 per cent. Semeleder in 49 crania met with it in 79·5 per cent., the septum being bent towards the left side in twenty, and towards the right in fifteen cases. In four instances the curvature was of a sigmoid outline, thus bulging into both nasal fossæ in different places. Allen, in 58, found the septum so much deflected in 68·9 per cent. as to come in contact with the upper and middle spongy bones; whilst Zuckerkandl, in 370 skulls, met with an asymmetrical position in 140 cases, *i.e.*, in 37·8 per cent. In fifty-seven cases the bend was to the right, in fifty-one to the left, and in thirty-two it was S-shaped. With the view of investigating the whole subject of septal asymmetry on a larger scale, I have lately made a careful examination of the collection of skulls in the Museum of the Royal College of Surgeons, with the assistance of Mr. C. L. Taylor. The total number of crania actually examined was 3,102, but of these only 2,152 had the bony septum in sufficient preservation to be tested. In each instance of septal asymmetry, the degree of deflection from the middle line of the face was measured as accurately as possible by means of a little instrument[1] which I devised for the purpose. It was found that the average deviation of the septum in the 2,152 skulls was about 4 millimetres; the greatest degree being 9 millimetres, and the least half a millimetre.[2] Among them no fewer than 1,657, or 76·9 per cent., presented a more or less unsymmetrical position of the septum. In 838, or 38·9 per cent. of the cases, the deviation was towards the left side; in 609, or 28·2 per cent., towards the right; in 205, or 9·5 per cent., the deflection was "sigmoid" in character, bulging towards *both* sides at different levels, whilst in 5, or 0·23 per cent., the irregularity was of a type that may be called "zig-zag," *i.e.*, the perpendicular lamina of the ethmoid and the vomer, instead of joining accurately to form a smooth plate of bone, lay in different planes, and overlapped each other at their contiguous edges. It must be remembered that these figures have reference only to the *bony* septum, and that deviations of the cartilaginous part probably occurred in a large proportion of those cases in which the bone itself was straight. Hence the actual percentage of deflections is much higher during life than would appear from the above statistics. According to Zuckerkandl the superior races show a greater disposition to this deformity than those of a lower type, for in 103 non-European crania it was present in only 23·3 per cent. My investigations yield very similar results, for of 438 examples of *symmetrical* septa only 22·6 per cent. were from Europeans,[3] the rest being from Africans, aborigines of the American Continent, natives of the Polynesian Islands, and a few from the Andaman Islands, the New Hebrides, New Guinea, the Solomon Islands, and from the Island of Teneriffe.

---

[1] "Lehrb. d. Anat." Wien, 1802, Bd. iii.
[2] "Traité complet d'Anat. Chir." Paris, 1837, 3e éd. t. i. p. 252.
[3] "Bull. de la Soc. de Chir." 1851–52, t. ii. p. 253.
[4] "Compendium de Chir. Prat." t. iii. p. 33.
[5] "Brit. Med. Journ." Oct. 2, 1875.
[6] "Berlin. klin. Wochenschr." 1882, No. 4.
[7] "Zeitschr. f. rationelle Medicin." Neue Folge, 1855, Bd. vi. p. 242. et seq.
[8] "Die Rhinoskopie." Leipzig, 1862. p. 64.
[9] "Anatomie descriptive," t. iii. 3e éd. Paris, 1877, p. 674.
[10] "Amer. Journ. Med. Sci." Jan. 1880, p. 70.
[11] "Anatomie der Nasenhöhle." Wien, 1882, p. 44, et seq.
[12] "Asymmetrien der Nase." Stuttgart, 1882.
[13] "Arch. of Otology," vol. xii. No. 1, March, 1883.
[14] "St. Bartholomew's Hosp. Rep." vol. xviii. p. 11, et seq. See also "Lancet." April 12, 1883, p. 705.

The cause of deviation of the bony septum is very obscure. Cloquet[4] somewhat oracularly veils his ignorance of the matter under the high-sounding phrase, that curvature of the septum "depends on a primary law of organization." It was at one time thought that the condition was often of congenital origin, but according to the researches of Zuckerkandl the septum is always straight before the seventh year. It is not impossible that the deflection may result from the fact that ossification of the septum proceeds from centres situated in two different bones, and that these deposits of ossific matter do not subsequently meet in the same plane. As regards deviation of the cartilaginous septum, various causes have been assigned for the anomaly, such as always blowing the nose with the same hand, or habitually sleeping with the same side of the face on the pillow; but the evidence in support of these views is, to say the least, insufficient. Chassaignac[1] suggests that there may be a tendency to overgrowth in the vertical direction, and this being prevented by the firm bony attachments, the elastic substance of the cartilage necessarily bulges out laterally into one or other nasal fossa.

---

[1] This consisted of a couple of short metal bars supported on a cross-piece placed at right angles to one of them, the other being midway between the two—that is to say, at an inclination of 45° to each. The angle between the two little bars was subtended by a curved piece of metal constituting an arc which was graduated in millimetres, so that by placing the upright bar in a position corresponding to the middle line of the nose, the degree of obliquity of any object within the nasal cavity could be easily read off on the scale.

[2] Septa showing a deviation of less than half a millimetre were counted as straight.

[3] It is remarkable that nearly half of these were Italian skulls, which as a class were of strikingly symmetrical proportions.

[4] "Osphrésiologie." Paris, 1821, 2me éd. p. 165.

Symptoms.—When the deflection is considerable, the whole nose is twisted to one side, and the most casual observer notices the disfigurement; but when the deviation of the septum is not great, it may merely cause a slight twist of the tip of the nose, or it may not even give rise to any external alteration. Anterior rhinoscopy, however, makes the condition at once apparent, and though the deformity scarcely ever (never, according to my observations) affects the posterior part of the septum, the rhinal mirror often reflects the deviation in the central and anterior portions of the nose. The tumour frequently encroaches on the corresponding nasal channel, and in some cases completely occludes it. In such instances the distortion of the septum, in addition to its unsightly appearance, gives rise to functional troubles which may occasionally amount to serious inconvenience. Respiration through the nose is interfered with, the voice acquires the characteristic nasal twang, the discharge of the pituitary secretion through the nostril is prevented, and post-nasal catarrh, with its attendant evils, results. The turbinated bodies are not unfrequently so pressed upon that they undergo atrophy, and dry catarrh may then ensue. In a case recently under my care, the most troublesome symptom was epistaxis, caused by erosion of the outer wall of the nose.

Diagnosis.—It is difficult to understand how any error could be made as regards this disease, except by those who do not make a proper rhinoscopic examination, or who are entirely unacquainted with nasal affections. Yet the deformity has frequently been mistaken for thickening and sometimes for polypus.[1] Careful comparison of both sides of the septum at once determines the former point; but an ingenious "septometer" has been invented by Seiler,[2] which serves to distinguish thickening from deviation when these affections occur separately. Polypus can be easily recognized by its comparative softness, elasticity, mobility, and pale colour.

---

[1] "Bull. de la Soc. de Chir." 1851—52, t. ii. p. 253.

Pathology.—The deviation is almost always limited to the anterior three-fourths of the septum.

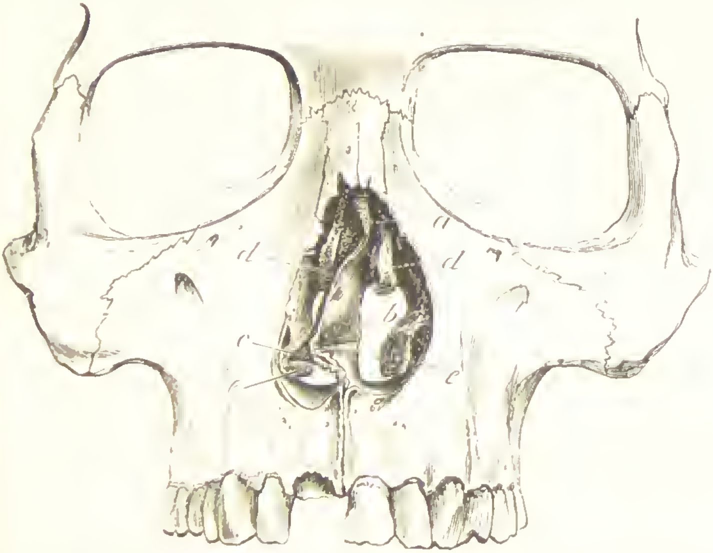

FIG. 86.—ANTERIOR NARES AND PART OF SKULL, SHOWING THE SEPTUM DEVIATED ACCORDING TO THE SIGMOID TYPE.

a, upper part of the septum bent towards the left side; *b*, concavity on left surface corresponding to convex portion bulging into right nasal fossa; *c*, bony crest or ridge projecting into left fossa; *dd*, middle, and *ee*, lower spongy bones. *(The amount of deviation here shown is seen in several specimens in the Museum of the Royal College of Surgeons, and bony ridges also occur in many of them. The above cut is a composite drawing of various deformities met with in different skulls.)*

The bony ridges already described as being common on the lower half of the septum (p. 390) are frequently found associated with curvature of that partition. Thus in 673 specimens, in the Hunterian Museum, in which a ridge existed, the septum was deviated in 588. In 414 instances the ridge was on the side towards which the septum projected, in 107 on the opposite side, and in 85 skulls there was a ridge without any deflection of the partition itself. Although, owing to the difficulty of determining with certainty the sex from the cranium alone, it is not possible for me to give exact figures on the subject, I am inclined to think that these bony ridges are relatively less common in women than in men, and that when they are present in the former they are (as might naturally be expected) both less thick and less prominent. The foregoing woodcut (Fig. 86) gives a very good representation of such a ridge, and of septal asymmetry in general.

---

[1] Chassaignac: Loc. cit. p. 256. I have myself also known this mistake to be made in more than one instance.

[2] "Diseases of the Throat, &c." 1883, 2nd ed. p. 83.

Treatment.—When the bony septum is the seat of marked deviation it might sometimes be possible to remedy the condition by fracturing the distorted partition with Adams's forceps (Fig. 72, p. 281), and fixing the fragments in a more symmetrical position by means of his splint introduced into each nostril. I am not aware that this method has ever been used for the rectification of natural deformity, but Adams has had such excellent results[1] from it in the treatment of fracture of the septum that it seems worth trying in cases of non-traumatic deviation. It is only, however, when the deflection is extreme that so severe a procedure would be justifiable.

The treatment of the bony outgrowths sometimes found in connection with a deviated septum has been already discussed (p. 391).

When the deviation is in the cartilaginous portion, the simplest plan of treatment is that of Michel,[2] who directs the patient to make gentle pressure on the nose with the finger, towards the opposite side. This must, of course, be done very frequently each day, and it is obvious that it is applicable only in the case of young persons, and where the deformity is comparatively trifling. Where the object of the surgeon has been more to remove a source of disease than to correct a deformity, good results have been obtained by establishing free communication between the unobstructed fossa and its fellow. This was first proposed and accomplished by Blandin,[3] who removed a piece of the cartilage with a kind of punch. Chassaignac[1] relieved a very bad case by dissecting up the mucous membrane, and paring off slices of the protuberant cartilage, thus reducing its bulk and freeing the nasal channel from the greater part of the obstructing mass. Walsham[2] forcibly replaced the bent septum of a patient in whom the deformity had caused loss of the singing-voice, at the same time incising the cartilage in a stellate manner to overcome its resiliency. The voice was completely restored.

---

[1] "Brit. Med. Journ." Oct. 2, 1875.

[2] "Krankheiten der Nasenhöhle." Berlin, 1876, p. 29.

[3] "Compendium de Chirurgie Pratique," t. iii. p. 33.

---

[1] Loc. cit. p. 256.

[2] Loc. cit.

BLOOD-TUMOURS OF THE NASAL SEPTUM

History.—The first clear account of hæmatomata and abscesses of the nasal septum was given by Cloquet in 1830,[1] and three years later the affection was described by Fleming,[2] from his own observations. Examples have since been published by Bérard,[3] Maisonneuve,[4] Velpeau,[5] and others; and in 1864 Beaussenat[6] took these affections as the subject of his inaugural thesis. A brief account of them was given by Casabianca,[7] in a short essay published in 1876. I have myself met with only one case of blood-tumour and one of septal abscess.

---

[1] "Journ. Hebd. de Méd." No. 91, t. vii. p. 545.

[2] "Dublin Journ. of the Med. Sciences." Sept. 1833, vol. iv. p. 16, et seq.

[3] "Archiv. Gén." t. xiii. 2e sér. p. 408.

[4] "Gazette des Hôpitaux." 1841, p. 59.

[5] Ibid. 1860, p. 178.

[6] "Des Tumeurs sanguines et purulentes de la Cloison." Thèse de Paris.

[7] "Des Affections de la Cloison." Paris, 1876, p. 23, et seq.

Violent blows on the nose, which give rise to fracture of the bony or cartilaginous septum, sometimes *cause* blood-tumours, which collect within a few hours after the accident. The swelling results from the effusion of blood between the deep layer of the mucous membrane and the underlying cartilage, and as this accident seldom occurs without fracture, the collection of blood usually takes place on both sides of the septum, and a bilateral tumour is formed. Two cases of *spontaneous* unilateral hæmatoma of the septum have been recorded. One was related by Luc,[1] in which an Arab boy, aged ten, had complete obliteration of both nostrils, dating apparently from an attack of confluent small-pox, from which he had suffered five years before. On dividing the cicatricial tissue, a blood-cyst was found in one nostril attached to the septum. In the other case, reported by Péan,[2] few details are given, but the tumour, which was connected with the septum, was soft, pale blue in colour, and contained blood. Blood-tumours have a smooth surface and are purple in colour, the rest of the mucous membrane of the nose, as pointed out by Fleming, being often of a similar ecchymotic hue. They are situated just within the nostrils, and in the only case which I have met with had very much the appearance of cysts. They are easily seen, and their symmetrical character, together with the fluctuation from one side of the septum to the other, which can be perceived when the tumour is examined with a forefinger in each nostril, generally serve to determine its nature. When the swellings are large, they sometimes even protrude from the nostrils. Their soft consistence serves to distinguish them from bony or cartilaginous tumours, and their symmetrical origin by a broad base from each side of the septum differentiates them from polypus. It is difficult, however, to discriminate between these tumours and septal abscesses, into which, if not cured, they soon pass. The patient rarely recovers without a permanent aperture in the septum.

---

[1] "Bull. de la Soc. de Chir." 1875.

[2] Nélaton: "Pathologie Chirurgicale." 2e éd. t. iii. p. 740.

If *treated* sufficiently early, hæmatomata may sometimes be dispersed by the free use of evaporating lotions; but if this plan does not succeed within a day or two, there is every chance of purulent degeneration of the extravasated blood taking place, and of the formation of an abscess. It is better, therefore, to empty the sacs by opening one of them at its most dependent part; and should this not suffice for the complete evacuation of the contents of both tumours, the other one should also be opened. Jarjavay[1] recommends that general antiphlogistic treatment should be combined with these surgical measures, especially at the outset.

CASE OF HÆMATOMA OF THE NOSE.

W. H. E., aged twenty-seven, a farrier, was brought under my notice at the Throat Hospital, in March, 1863, by Dr. Frodsham. The patient stated that in shoeing a horse about ten days previously he had received a slight kick on the nose, but that the hoof had scarcely touched him. Since then, however, he had felt a constant dull aching sensation in the nose, which he said was "completely stuffed up." On examination, both nasal passages were seen to be blocked up by dark, red, round tumours, which appeared rather tense. On marking an exploratory puncture into the swelling on the right side, blood slowly oozed from the wound. A large opening was now made at the lowest part of the right tumour, and through it both cysts (for such they appeared to be) were evacuated. The next day, however, they had filled again. An incision, nearly half an inch in length, was next made in the left tumour, but three days later this also closed up. An opening was then made in both tumours, and a small piece of lint inserted in each. This treatment proved successful. Some sanious matter continued to escape from the left swelling for about fourteen days, when the wound healed. A purulent discharge from the right tumour gradually ceased at the end of a month. It was then noticed that there was a semi-circular aperture in the anterior part of the septum, about half the size of a fourpenny-piece, the edges of which were ulcerated. The patient had never noticed any solid matter come away. The rest of the mucous membrane of the septum was rather dry and of a deep red colour. With the exception of the opening the patient ultimately recovered completely.

---

[1] "Bull. Gén. de Thérap." 1867, t. lxxii.

ABSCESS OF THE NASAL SEPTUM.

(*For History see last Article.*)

These abscesses may be acute or chronic.

The *Acute* septal abscess is mostly of traumatic *origin*, and comes on within a few days, though sometimes not for a week or two, after the injury. It may result directly from the inflammation of the parts, or it may be due to the degeneration of a blood-tumour, as described in the foregoing article. Like the latter, the abscesses are generally situated at the fore part of the septum, and they are almost always symmetrically bilateral. They present the ordinary characters of an inflamed part, and may be accompanied by some slight constitutional disturbance. The nose is obstructed, the voice muffled, the conjunctivæ are red and extremely sensitive to light, whilst there is frequently profuse lachrymation. There is often also a good deal of redness and tenderness of the skin of the nose itself. *Chronic* abscesses have the same shape and position as those of an acute character, and usually arise from the same causes. They are, however, much less quick in forming, less painful, of a lighter colour, and are accompanied by little or no systemic disturbance. They have been mistaken for mucous polypi, but the points of diagnosis already indicated in dealing with haematomata are amply sufficient to differentiate these tumours. Like blood-tumours, their cure is generally followed by a permanent opening in the septum. The only effectual *treatment* is to evacuate the contents of the sacs; and free drainage can only be insured by opening both the tumours, and keeping the incisions patent with a small linen tent or by the occasional introduction of a probe.

CASE OF CHRONIC SEPTAL ABSCESS.

Charles H., a labourer, aged thirty-one, had been under my care at the London Hospital, for a short time, in the early part of 1870, on account of general weakness after typhoid fever, when at one of my visits he complained of difficulty of breathing and "stoppage" in his nose. On making an examination, I found two pale pinkish yellow swellings, blocking up each nostril. They were rather tense, did not pit on pressure, nor show signs of fluctuation. The patient had at the time been convalescent from his attack of fever for seven weeks: that is to say, he had been going regularly out of doors during that period, and he stated distinctly that until a week before he had never felt anything the matter with his nose. On making an incision into one of the tumours, pus freely poured out, and on pressing the other tumour, it also was completely emptied, a small quantity of chalky matter coming away with the contents. On passing a probe, an oval opening, nearly half an inch in length and a quarter of an inch in height, was found at the anterior part of the cartilaginous septum. An incision was made into the other abscess, not previously opened, and rapid healing took place, leaving, of course, the perforation in the septum already described.

FOREIGN BODIES IN THE NOSE.

Latin Eq.—Corpora adventitia in naribus.
French Eq.—Corps étrangers des fosses nasales.
German Eq.—Fremdkörper in der Nasenhöhle.
Italian Eq.—Corpi stranieri nelle narici.

DEFINITION.—*Foreign substances lodged in the nose most commonly gaining access by the nostrils, but occasionally passing upwards from the throat or penetrating the integuments.*

History.—The literature of foreign bodies impacted in the nasal channels consists almost wholly of scattered cases reported in medical treatises and periodicals. Among the most remarkable examples on record may be mentioned one[1] in which a fragment of an explosive shell remained in a man's nostril for seventeen years, and finally found its way out; and another[2] in which a musket-ball was lodged within the patient's nose for twenty-five years without its existence being discovered. Several instances have been reported by Renard,[3] Boyer,[4] and others,[5] in which vegetable bodies lodged within the nose have, to the great discomfort of the patient, germinated *in situ*. Remarkable examples of the long sojourn of foreign substances within the nasal cavity have been related by Hickman[6] and Tillaux,[7] and an interesting paper has been written on the whole subject by Bron.[8]

---

[1] "Ephem. Nat. Cur." Dec. iii. ann. v. et vi. obs. 300.
[2] Ibid. Cent. x. obs. 80.
[3] "Journ. de Médecine," t. xv. p. 525.
[4] "Traité des Malad. chirurg." Paris, 1846, t. v. p. 65.
[5] Blasius: "Obs. Med. Rarior." p. ii. No. 8; and "N. Act. Nat. Cur." vol. ii obs. 20.
[6] "Brit. Med. Journ." 1867, vol. ii. p. 266.
[7] "Bull. de la Soc. de Chir." January 26, 1876.
[8] "Gazette Médicale de Lyon." 1867, No. 36.

Etiology.—The accident most frequently happens to children, who amuse themselves by putting beads, peas, beans and other small bodies into their noses. Insane people also sometimes introduce foreign bodies into the nasal cavity. In vomiting, hard substances, such as fruit stones, which had previously accidentally reached the stomach, have been forced into the nasal passages and have become impacted there. This accident is, of course, more likely to occur if the soft palate is paralysed. Further, foreign bodies may occasionally be driven into the nares from below, when a person swallows "the wrong way," the effort to prevent the foreign substance passing below the glottis, causing it to be forcibly driven up into the nose. An extraordinary instance is related by Hickman,[1] in which he removed from the posterior nares of a girl a steel ring, three-quarters of an inch in diameter and half an inch wide, which had been lodged there for thirteen years and a half. Portions of knives,[2] bayonets,[3] or bullets[4] that have pierced the skin sometimes become lodged in the nasal fossæ, but such bodies usually give rise to wounds, without becoming themselves impacted. A case is recorded by Legouest,[5] in which a carpenter stabbed a man in the nose with a pencil, the broken end of which was subsequently removed through the nares.

Symptoms.—Foreign bodies, when introduced by children or insane persons, generally lodge in the lower part of the nasal fossæ, but this is by no means an absolute rule. The symptoms depend on the size, form, and nature of the foreign body. If the substance be small and round, it may remain for a long time in the nose without producing any symptoms at all. Vegetable bodies, however, such as peas or beans, imbibe moisture, and thus swell considerably. As already remarked, they sometimes germinate in the warm, moist atmosphere of the nasal chambers, and they may thus give rise to very troublesome symptoms. In Boyer's case a haricot bean shot out ten or twelve roots, and produced the appearance of a polypus, for which it was, in fact, mistaken. If the foreign body is sharp-pointed or irregularly angular in shape it causes very great irritation, and an attack of acute rhinitis frequently supervenes. When the substance is large, more or less obstruction of the passages is produced, and the patient is obliged to keep his mouth constantly open. In the earlier period there is often intense headache with pain in the nose and cheek, and these pains occasionally assume a distinctly neuralgic character. A very instructive case of this kind has been published by Verneuil, in which the pain came on two or three times a month, and perfectly simulated facial neuralgia. If the foreign body remain in the nose for any time, the acute rhinitis gradually passes off, leaving, however, in its place, obstinate chronic inflammation and an extremely fetid discharge from the nostrils.

---

[1] Loc. cit.

[2] Legouest: "Traité de Chirurgie d'Armée." Paris, 1863, p. 383.

[3] Ibid.

[4] Lemaistre: "Bull. de la Soc. Anat." Oct. 1874, p. 632. Lawson: "Diseases and Injuries of the Eye," 2nd ed. p. 336. Gaujot, quoted by Casabianca: "Des Affections de la Cloison des Fosses nasales." Paris, 1876, p. 22.

[5] Op. cit. p. 383.

Diagnosis.—The recognition of the accident presents no difficulty, if there be a clear history of the introduction of a substance into the nasal passage, but in many cases such information will not be forthcoming, either from wilful suppression or genuine ignorance. When, therefore, a case of fetid discharge from the nostril is met with, especially if the patient is a child, the possibility of the complaint being caused by the presence of a foreign body should always be borne in mind, and a thorough examination of the nasal fossæ should be made, both from the front and from behind. As, however, an impacted foreign body is very likely to be covered with mucus, the nasal passages should be washed out with a spray of tepid salt water before rhinoscopy is practised. If careful inspection should fail to detect any foreign substance, a search should still be made with the nasal probe; and in order that the examination may be quite satisfactory, it may be necessary, in some cases, that the patient should be rendered insensible.

Prognosis.—The prognosis is almost always favourable, for the foreign body can, in the majority of instances, be easily removed, and then all the symptoms rapidly disappear.

Treatment.—The foreign body should be extracted as soon as practicable, but it should be remembered that the condition is not in itself dangerous, and that therefore there need be no undue haste in carrying out treatment. A thorough inspection of the nasal cavities should first be made with the help of the speculum, and if this does not prove successful the offending substance should be searched for with the probe. If the examination is badly borne, and especially if the patient is a child, an anæsthetic should be administered. When the situation of the foreign body has been accurately determined by either of these methods, it should be removed with fine forceps, bent at the proper nasal angle (see Fig. 39, p. 257). Sometimes when the foreign body is situated very far back, as in Hickman's case already referred to, it may be more easily removed by means of forceps passed through the mouth behind the soft palate. Gross's spuds and hooks (Fig. 70, p. 281), may be useful for the extraction of peas and seeds of various kinds. Should it be found impossible by careful exploration to discover the whereabouts of the foreign body, or should the latter be so firmly impacted that it cannot be dislodged without using undue violence, other measures must be resorted to. If the patient be an adult, or a child who has attained the age of eight or nine years, it is a good plan to make use of the continuous douche, a little warm salt water being passed up the free nostril and brought out through the side where the substance is lodged. When the foreign body is small, a pinch of strong snuff will often enable the patient to expel it by sneezing. An ingenious, but unpleasant, method was adopted in a case related by King.[1] A cherry-stone had become impacted in a child's nose and could not be dislodged; at last a powerful emetic was given, and when vomiting was about to commence a handkerchief was held tightly over the little patient's mouth, so that the fluid was thrown through the nares, washing out the foreign body in its course. If it can be avoided, it is very undesirable to attempt to push the foreign substance backwards, in the manner sometimes recommended, as there is danger of its falling into the larynx; but if the body is large and tightly impacted into the posterior part of the nares, the practitioner may be obliged to risk this accident. He should, of course, take the precaution of introducing his left index finger through the mouth into the naso-pharynx, whilst with the right hand he is manipulating through the front of the nose.

If the substance be large, and the symptoms caused by its presence very troublesome, Rouge's operation (see "Fibrous Polypi of the Naso-Pharynx") may be necessary.

---

[1] "Amer. Journ. Med. Sci." April, 1860.

RHINOLITHS.

History.—The earliest allusion to these deposits is in a work by Matthias de Gardi,[1] who, however, merely mentioned, somewhat vaguely, a case at second hand. Two examples were observed by Bartholin,[2] one apparently of spontaneous origin, the other containing a cherry-stone as a nucleus. Clauder,[3] Kern,[4] and Reidlinus,[5] each recorded one case, and Wepfer[6] described two instances of the complaint. In 1733 a case was related by the great anatomist Ruysch,[7] and soon afterwards Plater[8] discussed the origin of nasal concretions. Other examples were recorded by Savialles,[9] Grafe,[10] Thouret,[11] Axmann,[12] Brodie,[13] and Demarquay.[14] The last-named author, in describing a case of nasal calculus, which he had had an opportunity of observing while it was under the care of Blandin, discussed the whole question of the origin, symptoms, composition, and treatment of these bodies, and collected all the previously recorded cases that he could find. It is, in fact, to his careful account of the literature of the subject that I am mainly indebted for the above brief historical summary. Cases have since been reported by Cook,[15] Kostlin,[16] Rouyer,[17] W. N. Browne,[18] Verneuil,[19] West,[20] Roe,[21] Hering,[22] and Nourse.[23]

Rhinoliths generally owe their *origin* to the accidental impaction of small foreign bodies around which the salts of the pituitary secretion collect. Thus in Hering's case the nucleus of the formation was a button, which had become firmly fixed in the nasal passage of a boy aged fourteen. Gräfe suggested that rhinoliths are usually of gouty origin, but out of fifteen cases collected by Demarquay there was only one in which a gouty diathesis could be distinctly recognized. Occasionally in the centre of the calculus an albuminous liquid or a fatty proteine substance has been found, but it appears doubtful whether in these cases the matter contained in the centre of the calculus was the remains of the original morbid secretion, or whether it was due to the softening of some foreign material primarily forming the nucleus of the stone. Chronic inflammation no doubt promotes further deposition, and may in some cases give rise to the original formation. Any cause which obstructs the outflow of the secretion may lead to the formation of a calculus. In Browne's case the nostril had been blocked up for some years.

---

[1] "Pratica." Venetiis, 1502, pars. ii. cap. 14, p. 308.
[2] "Hist. Anatom. Rar." 1654, cent. i. p. 47 ; also cent. iv. p. 404.
[3] "Ephem. Nat. Curios." 1685, dec. ii. ann. xiii. obs. 78.
[4] Ibid. 1700, dec. iii. ann. v. and vi. obs. 43. p. 100.
[5] Ibid. 1706, dec. iii. ann. ix. and x. obs. 145, p. 268.
[6] "Observ." 192, p. 905. 1727.
[7] "Obs. Anat." Amstelodami, 1733. Obs. 44, p. 42.
[8] "De Olfactûs Lesione." 1736, lib. i. c. 9, p. 264.
[9] "Bull. de la Faculté de Méd." 1814, t. iv. p. 44.
[10] "Annales d'Oculistique." 1828, t. viii. 4e et 5e livraison, p. 203.
[11] "Arch. Gén. de Méd." 1829, t. xix. p. 27.
[12] Ibid. 1829, 1e série, t. xx. p. 102.
[13] "Lancet." Jan. 6, 1844.
[14] "Arch. Gén. de Méd." 1845, 4e série, t. viii. p. 174. et seq.
[15] "Ranking's Abstracts." 1847, vol. vi. p. 132.
[16] "Würtemberg Corresp.-Blatt." 1854.
[17] "Bull. de la Soc. Anat. de Paris." 1857, p. 60.
[18] "Edin. Med. Journ." 1859, vol. v. p. 50.
[19] "Gaz. des Hôpitaux." 1859, p. 25.
[20] "Lancet." 1872, vol. i. p. 147.
[21] "Archives of Laryngology." 1880, vol. i. No. 2, p. 149, et seq.
[22] "Monatschr. f. Ohrenheilk." 1881, No. 5.
[23] "Brit. Med. Journ." Oct. 1883, p. 728.

The *symptoms* caused by rhinoliths are similar to those already described as being produced by foreign bodies; but they generally come on more slowly, and as the calculus continues to increase in size, in the end they cause more inconvenience. A fetid discharge is usually the most troublesome feature of the complaint. The shape of the stone varies, but it is generally irregularly oval, and varies greatly in size. In Browne's case it attained the enormous dimensions of an inch and three-quarters in length, one inch in breadth, and nearly half an inch in thickness, whilst its weight was three drachms and thirty-three grains. When the calculus is situated in the upper and anterior part of the nasal cavity it may cause a swelling on the face (see Case 2 below), and under these circumstances the lachrymal canal is apt to be obstructed. The stone is usually single, though occasionally, as in the cases of Axmann and of Blandin, several calculi may be present, and in one of my own cases (No. 1) there were two. Their surface may be smooth, but, as a rule, it is somewhat rough and mammillated, and their colour is most frequently greyish-black. Sometimes they are partly covered by the mucous membrane, in which they have become imbedded, the edges of the membrane being, under these circumstances, puffy and ulcerated, and disposed to bleed.

The *diagnosis* is often very difficult; indeed, a calculus cannot always be readily distinguished from an osteoma, and owing to the fungous bleeding appearance of the mucous membrane, and the great swelling which may be present, a rhinolith has even been mistaken for cancer.[1] If the calculus is movable, or if its surface can be penetrated by a sharp probe or needle, it is not likely to be confounded with an osteoma. The slow course of the disease, and the absence of pain, serve to distinguish it from cancer, whilst the most casual examination will at once enable the experienced surgeon to recognize a polypus. The composition of nasal calculi is very simple, for they merely consist, as Prout[1] has shown, of mucus and phosphate of lime. They are generally hard on the surface, and softer towards the centre, an outside wall being formed round them, and constituting a covering something like an egg-shell. This, however, is not an invariable rule, for in one of my cases the calculus was of extreme hardness throughout. The *prognosis* is favourable, as, when once discovered, the stone can nearly always be removed, and the patient cured. The *treatment*, consisting, as it does, in extraction of the calculus, can usually be carried out with common polypus-forceps, but if the stone has attained to too great dimensions to permit of its immediate removal, it should first be crushed with a lithotrite of a size and shape suitable for use within the nasal cavity. In one of my cases the stone could only be brought away after being cut through with powerful bone-forceps. Hering having failed to get the stone out with forceps, pushed it backwards through the posterior nares, when the patient himself was able to "hawk" it out.

---

[1] Jacquemin, quoted by Spillmann: "Dict. Encycl. des Sci. Méd." t. xiii. p. 24.

The following examples of this complaint have occurred in my own practice :—

Case 1.—James S., aged thirty-seven, a gentleman's servant, applied at the Throat Hospital in May, 1876, on account of a discharge from the left nostril, from which he had suffered for six years. On examining the nose a calculus was seen in the middle meatus. The stone was in a great measure covered by mucous membrane, which had grown over it. Several attempts at extraction were unsuccessful, and it was only after making an extensive incision along the lower border of the middle turbinated body, that the calculus was brought away in several fragments. The patient was subsequently treated with mild alkaline washes, and at the end of six weeks had completely recovered : the nasal passages being perfectly clear, and there being no discharge. From an examination of the fragments, it appeared that there had been two oblong stones placed in a line one with the other, and touching at one end. One of them measured a centimetre and a half in length and eight millimetres across, the other was rather smaller : neither of them appeared to have any nucleus. The surface of both calculi was harder than the interior, and of a lighter colour. They weighed together forty-seven grains.

Case 2.—Mr. H. S., aged sixty-three, a Government official at Jamaica, consulted me in June, 1882, on account of a troublesome discharge from the right nostril. He had previously seen several practitioners with reference to his ailment, one of whom had told him that he had a polypus in his nose, whilst another assured him that he had nothing the matter with him, and a third frankly confessed himself unable to discover the cause of his complaint. Mr. S. had resided for some years in the tropics, and had suffered from severe attacks of ague, but otherwise he had been a very healthy man till about four years before he came under my notice, when he had been treated for stone in the bladder, and a "mulberry" calculus had been removed by crushing.

---

[1] "Lancet," Jan. 6, 1844.

On inspection I found the right side of the nose from near the angle of the eye to the upper border of the lower lateral cartilage filled out by a hard tumour, the skin over it being perfectly healthy. A dark brown fetid discharge came from the right nostril, and on examining the interior of the nose with the speculum, the right nasal cavity was found to be occupied by a large calculus extending from the level of the inferior turbinated body to the roof of the nose. The surface of the stone was rough, of a greyish-black colour, and very hard. On attempting extraction with forceps, some small fragments were got away, together with a little slimy grit, but no sensible diminution in the size of the calculus was effected. I subsequently attempted to use a lithotrite, but owing to the shape, hardness, and situation of the stone, I found it impossible to crush it; I finally succeeded, however, in dividing it with powerful bone-forceps. Even then the large fragments could not be extracted. As a last resource I passed a string through the nose into the mouth, and having attached a strong plug of lint to the distal end, drew it forward again through the nasal fossa, and in this manner managed to bring the divided stone within reach of the blades of the lithotrite, and finally to crush it. On examining the fragments no nucleus could be discovered, but if there had been one it might easily have eluded observation. The total weight of the *débris* was seventy grains. Considerable hæmorrhage followed this operation; and rather extensive facial cellulitis,[1] without, however, very marked pyrexia, supervened on the following day. This lasted for nearly a week, and recurred on four subsequent occasions at intervals of a few days, although no further operation was attempted. By the time Mr. S. had recovered from these attacks his leave of absence had expired, and he was obliged to return to Jamaica. Unfortunately a small fragment of the stone still remained in the extreme upper part of the nose, and this is very likely to become enlarged by further accretions.

[1] Hack ("Beiträge zur Rhinochirurgie," Wien, 1883, p. 24) has recently drawn attention to the fact that a tendency to a low form of erysipelas of the neighbouring parts of the face is a not unfrequent complication of inflammatory disease within the nose.

MAGGOTS[1] IN THE NOSE.

Latin Eq.—Myasis narium.
French Eq.—Larves dans les fosses nasales. Myase du nez.
German Eq.—Würmer in der Nasenhöhle.
Italian Eq.—Larve nelle fosse nasali.

DEFINITION.—*Destruction of the soft tissues, and sometimes of the bones, of the nose, by maggots hatched from eggs deposited within or close to the nostrils by dipterous insects, causing gnawing pain, insomnia, and sometimes convulsions, coma, and death.*

Though this affection is the cause of wide-spread suffering among the native population of our extensive tropical possessions, it is scarcely referred to in any standard English work. Indeed, in the entire medical literature of the world there is not a single essay dealing fully with the whole subject. Under these circumstances it seems to me desirable to lay before my readers an analysis of the scattered articles which have appeared from time to time, for the most part, in rare books or inaccessible journals.

History.—Previous to the present century there are only a few examples of myasis of the nose on record. Gahrlieb[1] reported an instance in which a peasant, afflicted with great pain in the forehead and root of the nose, made a decoction of pungent herbs, and inhaled the steam. Epistaxis came on, and was followed by the expulsion of several living maggots. The next case is that of Behrends,[2] who treated a woman, suffering from unbearable headache and slight swelling of the face, by injecting into the nose decoctions of tansy, rue, and absinth. Thirty maggots were brought away, and the patient was cured. A still more striking example of myasis was published twenty years later by Wohlfahrt,[3] in which a patient suffering from terrific headache was treated by inhalations of

[1] "Ephem. Nat. Curios." Dec. iii. ann. vii. et viii. obs. 141. p. 260.

[2] "Scharschmidt's Med. und Chir. Nachrichten." Berlin, 1743, 1 Jahrg. p. 214.

[3] "Observ. de Vermibus per Nares Excretis." Halæ Magdeburgicæ, 1768. These cases will all be found in Tiedemann ("Würmer in den Geruchsorganen," Mannheim, 1844), but the reader who is anxious to pursue the subject will find these and many other references in Ploucquet's laborious Index ("Literatura Medica Digesta," Tubingæ, 1809, sub voce "Vermis").

---

[1] This subject has been briefly referred to in some text-books under the general head of "Parasites in the Nasal Fossæ," but this designation is inaccurate. Maggots can hardly be said to be *parasites*, for, as Moquin-Tandon ("Eléments de Zoologie Médicale," Paris, 1859, page 215) points out, the essence of parasitism consists in the remarkable fact that an individual may live at the expense of another, without any very serious results occurring to the animal fed upon.

alcohol, and eighteen maggots were brought away. These were placed in a box, and in thirty days developed into flies. Fifty years later, a case in which an infant eight months old expelled some worms from the nose was briefly referred to by Tengmalm,[1] and towards the end of the last century, Azara[2] had several opportunities of witnessing the effect of maggots within the nose, in Paraguay. In 1830, Macgregor[3] published an example of the disease, which he had observed in British India. Cases met with in the same country have since been reported by Lahory,[4] Moore,[5] and Ohdedar[6]; whilst the affection was closely studied by Coquerel[7] in Cayenne; by Morel,[8] Gonzalez,[9] Jacob,[10] and Weber,[11] in Mexico; and by Frantzius,[12] in Costa Rica. In Europe, Mankiewicz[13] reported a case which had been treated by himself, Moquin-Tandon[14] related examples which had been witnessed by D'Astros and others, and an instance was recorded by Petrequin,[15] which he had met with in Italy.

Of the observations made in *British India*, Macgregor's was the first. The patient was a man who for three months had felt pain in the left cheek and inside the nostril. On blowing his nose violently some worms came out, which alarmed him very much, but gave him some relief. Subsequently his cheeks swelled, a fetid bloody discharge issued from the nose, he became greatly excited, and had attacks of shivering: ammonia was used to excite sneezing, and about a hundred larvæ were expelled. They were about half an inch in length, thinner at the front than behind, segmented, and without feet. Their colour was white, but they had black spots at the posterior extremity.

Lahory, a native practitioner, educated in the European system of medicine, wrote an interesting article on "Peenash,"[16] a term used in Hindostan for an ulcerative disease of the nose in which maggots are present. He states that he has seen it in patients of all ages, from nine years to eighty, and that it is most common in the hot weather, from July to September. He observed that bad food and dirt predispose to the disease, and that it is most frequently seen in persons whose noses are flattened from falling-in of the bridge. The symptoms which he noticed were deep-seated indescribable pain over the frontal sinuses, in the orbits, and in the ears, with a crawling sensation inside the nose. Epistaxis very often occurred. The patient had a disposition to hold the head down, and there was so much ecchymosis and swelling of the eyelids that vision was often obstructed. As the disease went on, ulceration of the nose took place, and a large portion of the organ frequently sloughed away. There was often high fever, with severe constitutional symptoms. At Allyghur, between December, 1851, and March, 1855, there were 91 admissions to hospital for "Peenash." Of these cases 46 were cured, 14 relieved, and 29 ceased to attend, whilst 2 died. Lahory describes the maggots as being white or yellow, and often having black spots on the head and tail, their size being that of the ordinary maggots seen in putrid animal matter. They have a distinct head, eyes (?), mouth, body, and a tail generally arranged in eleven spiral turns, each spire being a separate joint, by means of which the animal moves. The worms are free, or loosely confined in membranous cysts. The treatment recommended by Lahory consists in the injection of turpentine or infusion of tobacco, combined with the internal use of alteratives and tonics.

---

[1] "Kongl. Vetenskaps Academiens Handlingar." 1796, p. 285.

[2] "Voyages dans l'Amérique méridionale." 1781 - 1801. Par Don Félix de Azara. With notes by Cuvier. Paris, 1809, t. i. p. 216.

[3] "London Med. and Phys. Journ." 1830, vol. lxiv. p. 498, et seq.

[4] "Edin. Med. Journ.' Oct. 1856, vol. ii. pp. 371, 372.

[5] "Indian Med. Gazette." 1871.

[6] Ibid. 1851, vol. xvi. p. 80.

[7] "Archiv. Gén. de Méd." 1858, t. ii. p. 513, et seq. See also "Annales de la Soc. Entomologique." 1858, p. 173.

[8] "Recueil de Méd. Milit.' 1865, 3e série, t. xiv. p. 516, et seq.

[9] "La Mosca Hominivora." "Disertacion leida en la Academia Medico-farmaceutica de Monterey la noche del 3 de Marzo, 1865, por el Profesor de Medicina y Cirugia D. José Eleuterio Gonzalez."

[10] "Rec. de Méd. Milit." 1866, 3e série, t. xvii. p. 58, et seq.

[11] Ibid. 1867, 3e série, t. xviii. p. 158, et seq.

[12] "Virchow's Archiv." Bd. xliii. p. 98.

[13] Ibid. 1868, Bd. xliv. p. 375.

[14] "Elém. de Zoologie Médicale." Paris, 1859, p. 212.

[15] "Fricke u. Oppenheim's Zeitschr. f. d. gesammte Med." 1838, p. 276.

[16] The word is said to be of Sanskrit origin, but its resemblance to the French word *punaisie* is very remarkable, and it is not impossible that the term now used in India may have been introduced by the French at Pondicherry. On the other hand, it is possible that both words are derived from a common root (see foot-note 1, p. 332). If it could be shown when the term was first employed, it would have an important bearing on the etymological question. It may be remarked that camels in India are commonly led about by a ring which passes through the cartilage of the nose, and the ulcerated surface is constantly covered with maggots, the animals being said to suffer from "Peenash" (Moore: "Native Practice in Rajpootana"—"Ind. Med. Gaz." 1871).

In a case of "Peenash" recently described by Ohdedar, a native surgeon in the Indian service, the patient was a woman, about whom a disagreeable smell was noticed, but whose nose only showed thickening of the mucous membrane. In the hard palate, however, there was an opening of the size of a four-anna piece (a centimetre and a half in diameter), and through it eight maggots were removed, each having a distinct nidus. Epistaxis occurred on more than one occasion, and there was subsequently œdema of the face and eyelids. The throat and nose were syringed with a weak solution of muriate of iron, and afterwards with oil of turpentine. Ulceration took place near the inner canthus of both eyes, and through the broken skin maggots escaped, causing great pain. Erysipelas of the nose and eyelids ensued, and the patient ultimately died from coma.

Of the information collected in *South America*, that obtained by Coquerel is of great value. This surgeon, an officer in the French naval service, temporarily stationed at Cayenne, in French Guiana, has given the most detailed report of myasis of the nose which has yet been published. He does not appear to have seen any patients himself, the cases having been treated by his brother officers, MM. St. Pair and Chapuis, but he had access to their reports, and was able to determine the class of insect whose larva caused the disease. In his article it is not stated whether flies deposited their eggs within the healthy nose, or whether, as in the case of the Indian "Peenash," the maggots were only found when the mucous membrane was in a morbid condition. The principal symptoms noticed at Cayenne were formication in the nose with severe frontal headache, accompanied in some cases by a sensation resembling "blows with an iron bar": there was also œdematous swelling of the nose, extending over the face, and especially involving the eyelids. Severe epistaxis was often met with, and not unfrequently there was considerable inflammation of the internal tissues of the nose, which in some cases spread to the meninges, and thus caused death. Tumours occasionally formed on the outside of the nose, which after "pointing" opened spontaneously, and from them large numbers of larvæ escaped. When the nose was syringed with a solution of alum or a decoction of tobacco, a quantity of larvæ were frequently expelled, the aggregate number in a single case sometimes amounting to two or three hundred. In the patients that recovered, the septum was frequently in a great measure destroyed, and in many cases the nose was almost eaten away. Of six men treated by St. Pair, three died with symptoms of meningitis; whilst in two of the survivors the nose had completely disappeared, and in one it was terribly deformed. In the fatal cases the meninges were found of a deep red colour and full of blood, especially at the base of the brain. The cerebral substance itself was injected, and the ventricles filled with bloody serum. One patient who had nearly recovered was attacked by erysipelas of the face and scalp, from which he died; and in this case, at the post-mortem, bundles of larvæ were found encrusted in the frontal sinuses and antrum. Coquerel states that the surgeons at Cayenne generally insufflated alum, or injected a decoction of tobacco, but with indifferent success, as this treatment often made the membrane puffy, and closed the openings into the sinuses. He observes that if killed, the maggots no doubt often putrefy within the sinuses, and thus give rise to new symptoms. When there was reason to suspect that they had entered the frontal sinuses or the antrum, the Cayenne surgeons trephined these cavities. Coquerel carefully describes the insect which causes this fatal disease. The account of the maggot, pupa, and fly, as given by him, will be deferred to Etiology (p. 454), as it serves as the standard description of the insect.

When it was decided by the French Government, in 1862, to send a military expedition to Mexico, the Conseil de Santé directed the army surgeons to collect all the information they could concerning the disease produced by the entrance of flies into the nose; but, as far as I have been able to ascertain, the only officers who responded were Morel, Jacob, and Weber. The information, however, which they collected in *Mexico* added to our knowledge of the disease, and led to more certain methods of cure.

Morel based his observations on five cases which had come under his own notice. He thinks that the fly always enters the nose during sleep, and believes that dirty people and those suffering from ozæna are particularly liable to be attacked. In four out of his five cases such persons were the subjects of the disease, whilst in the fifth the patient was suffering from a boil close to the spot attacked. Morel observes that in the nasal fossæ, the mucous membrane and all the tissues are rapidly reduced by the maggots to the condition of a pulp, whilst the cartilages and bones are laid bare and soon become necrosed. His article is specially remarkable on account of its containing Assistant-Apothecary Danzats's recommendation of the use of chloroform as a specific for the destruction of maggots. He advised that chloroform diluted with half its volume of water should be shaken up, and injected before the two liquids have time to separate. Morel observes that all the patients on whom he used this remedy recovered as if by magic, except one on whom it was tried too late. Inhalation of chloroform generally detaches and brings away the larvæ at once, but if they are very deeply situated it should be injected.

Jacob learnt from the natives that the malady was tolerably common amongst them. They attributed it to a neglected cold, and hence regarded coryza with considerable dread. He reports a very severe case of myasis, which was cured by the use of chloroform injections and inhalations. *Pure chloroform* was injected several times. Although Jacob's paper was published subsequently to that of Morel, he claims to have invented the treatment after trying it with Dauzats on worms.

Weber spent a considerable time in Mexico between 1862 and 1866, especially at Orizaba, Cordova, and Montery, where, though the disease is said to occur, he did not see any cases himself, his information being principally derived from the published works and oral communications of Dr. Gonzalez. The highest situation at which the fly is found is at Orizaba, which is 1,200 metres above the sea-level, the point of greatest prevalence being at Acatlan, one of the hottest places in the southern part of the province of Puebla. The disease does not seem to be very common in Mexico, for in about twenty years Gonzalez had only collected fifteen cases; of these six died, four recovered with more or less destruction of the nose, and five were cured without any deformity. He points out that the most troublesome symptom is the insomnia caused by the movements of the worms at night. In the cases which had come under his notice the nasal fossæ, frontal sinuses, orbits, mouth, and sometimes the muscles and the skin of the face, were attacked, and once the entire face was destroyed. Gonzalez describes a case in which a young man saw a fly buzzing round him,[1] and tried to drive it away, but did not succeed, and it flew into his right nostril with great force. In the act of sneezing, which soon after occurred, the fly was driven out. Formication in the nose immediately came on, together with a little fever, and subsequently about a dozen large maggots were expelled. Others could be seen moving about in the nose in the midst of sanguinolent mucus. The patient suffered from sleeplessness, and epistaxis came on after many injections had been used. Altogether one hundred and thirty-four maggots were expelled, in addition to those which the patient sneezed out before he came under treatment. He left the hospital cured on the 4th of September, having been admitted on the 28th of the previous month. From this it will be seen how rapid is the course of the disease in a favourable case.

Before dismissing the descriptions by the French surgeons in Mexico, it may be observed that none of them appear to have made any special investigations respecting the natural history of the fly which causes so much havoc. This subject is indeed only referred to by Weber, who observes that he fully endorses the description of the fly given by Coquerel.

Frantzius, a German physician practising in the nearly adjoining region of *Costa Rica*, published some interesting remarks on the disease now under consideration. He observed that sneezing was an early and constant symptom, and attributed it to the tickling sensation caused by the gliding movement of the larvæ when they were seeking a suitable nidus. Considerable swelling and slight redness of the face were generally present, but the fetid, sero-sanguineous discharge from the nose, which, according to this observer, only becomes purulent after the expulsion of the larvæ, was a distinctive feature. The larvæ showed a preference for the floor of the nose posteriorly, and hence swelling of the soft palate was not unfrequently seen. In these cases the voice had often a nasal tone. There was usually some fever together with loss of appetite, and occasionally diarrhœa. Frantzius considered that the frontal symptoms often noticed were not due to the presence of worms in the sinuses, but to the extension of the inflammatory process to the mucous membrane lining these cavities. In one instance he removed ten maggots, in others from thirty to fifty. In the only case that ended fatally a hundred were taken away. The patient was an old woman, and Frantzius observes that the presence of larvæ in the nasal fossæ is a very serious condition when occurring in the aged and debilitated. The not inconsiderable destruction of tissue, the incessant discharge, the violent headache, the loss of sleep, and the constant fever, all tend to underuine the vital powers. He recommends the insufflation of calomel and powdered chalk (equal parts), and the removal of larvæ with forceps, pointing out that the fact of their being clustered closely together facilitates this procedure. Frantzius does not attach much importance to the various remedies which have been recommended for these cases, and believes that many of the supposed curative agents owe their apparent efficacy to the fact that when they were used the maggots had attained their full duration of larval life.[1]

---

[1] Moquin-Tandon observes (op. cit. p. 225) that the gadfly can often be seen hovering round a sheep, trying to enter its nose, whilst the sheep buries its nose in the turf in order to prevent the insect getting in.

In addition to the older cases already briefly referred to at the beginning of this historical sketch, four others have been recorded in the present century, as occurring in *Europe*. Petrequin, whilst making a tour in Italy, observed one in a hospital at Sienna. A woman, who complained of an extremely painful red swelling on the right cheek, and had some fever and slight delirium, passed several small white maggots from the nose. Curious as it seems, anthelmintic remedies were prescribed internally, and she was ordered to use them also as an inhalation. In the course of eight days fifty-eight maggots were expelled, and these subsequently developed into *luciliæ*.

Mankiewicz, a medical practitioner in Berlin, was induced to publish the following case on reading Frantzius' article, of which an abstract has been given: In a delicate boy, aged nine years, suffering from scrofulous ozæna, enormous quantities of maggots were seen adhering to the septum, and it was found impossible to remove them until they had been smeared over with a solution of balsam of Peru. A complete cure was effected, though the boy lost the tip of his nose.

Moquin-Tandon also records the two following cases:—In the first the patient was a woman under the care of D'Astros of Aix (Provence). She had fallen asleep in a field, when it is supposed that a fly deposited its eggs inside the nose. Soon after, slight pain came on in the frontal sinuses, with a sensation of formication about the root of the nose, and "a noise was heard by the patient and *others* like that produced by worms gnawing wood." (!) After severe epistaxis one hundred and thirteen maggots were expelled. In the second case, which occurred in a girl nine years of age, the patient suffered from intense headache and convulsions, but was cured by cigarettes of arsenite of soda.

---

[1] Frantzius seems to be under the mistaken impression that maggots arriving at maturity quit their previous habitat in order to form a cocoon. Their natural history in this respect will be found explained under the head of "Etiology."

The only case recorded from the *United States* is one lately published by Prince,[1] of Jacksonville, Illinois, in which a fly deposited its ova within the nose of an Irish farmer who was suffering from ozæna. In a short time maggots were developed: erysipelas and œdema of the nose and adjoining parts of the face supervened, and the patient could not breathe through his nostrils. Syringing with water proved utterly ineffectual, and the larvæ were gradually picked out with forceps. They were found to have stripped bare a considerable portion of the bony framework of the nose, and it is asserted that the ozæna was thereby completely cured.

[1] "(Philadelphia) Medical News." Oct. 14, 1882, p. 445.

Etiology.—The disease is seldom met with out of the tropics. Elevated situations, owing to their coolness, even in hot climates, are free from this pest, the observations of Gonzalez, already referred to, showing that, in Mexico itself, the affection is not met with at a level higher than 1,200 metres above the sea. Only a very few cases have been described as occurring in Europe. The disease is undoubtedly caused by the hatching of eggs laid by a fly (allied to our bluebottle and meat-fly) within the nose, or close to its orifice. The natural situation for these insects to deposit their eggs is in putrid meat, which affords proper nutriment for the larvæ when hatched; but instinct sometimes goes astray, as is seen in the case of the bluebottle fly, which occasionally deposits its eggs on the common snake-root (*Arum dracunculus*), being deceived by the cadaveric odour which that plant emits. It is by a similar error of instinct that the fly of hot climates occasionally deposits its ova within the nose. No doubt it is the fetid discharge from the nose which attracts the insect, and it is probably only by accident that eggs are deposited on a healthy mucous membrane. It has already been pointed out, that a great many morbid conditions of the nose are included under the head of "Peenash." In fact, the word corresponds to the vague term "ozæna,"[1] as formerly employed in European medicine, the only difference being that in "Peenash" maggots are sometimes present. The following is the description of the *Lucilia hominivora*:—The *fly* is nine millimetres in length, has tawny palps, and a light tawny face, the cheeks being covered with golden-yellow down. The head is large, wider in front than behind,

---

[1] See p. 330.

the thorax being dark blue, with black and yellow stripes, and the abdomen of the same colour. The feet are black, the wings transparent. The *larva* is dull white, fourteen or fifteen millimetres long by three or four broad, and narrower in front than behind. It is made up of eleven segments, the widest part of the body corresponding with the sixth. The head is indistinguishable from the first segment; there are no eyes; the mouth is formed by a sort of lip, on which are two small protuberances, at the base of which near the middle line there are two corneous mandibles placed side by side, the mandibular hooklets being very sharp and separated outside, though closely united in the thickness of the tissues. On each side of the first segment there is a brown corneous patch, which covers the orifices of the upper stigmata. At the base of each segment there is a projecting part, covered with small spines, very numerous and close together.

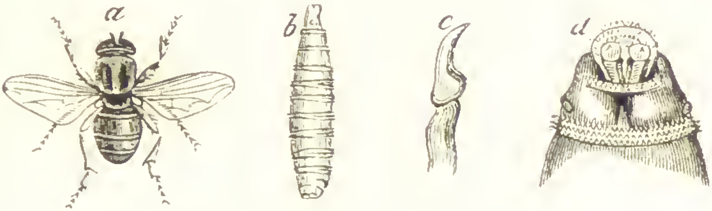

Fig. 87.—Lucilia Hominivora.

a. the fly; *b*, larva; *c*, a mandible; *d*, magnified view of the insect's head.

Macgregor's account of the maggot corresponds closely with Coquerel's, but the maggot described by Lahory is said to have had eyes. As these organs are not found either in the larva of *Lucilia hominivora* or in that of *Lucilia Cæsar* (common bluebottle), Lahory's maggot must have belonged to some other variety, or that observer must have made a mistake. He also speaks of the maggots as being confined within loose membranous cysts, whilst Ohledar states that in his case each maggot had a distinct nidus.

There are three kinds of European flies, all belonging to the order of *Muscidæ*, which may deposit their ova within the nose or near its entrance, viz., *Sarcophagæ*, *Calliphoræ*, and *Luciliæ*. The *Sarcophaga* is black, its thorax, however, being streaked with grey, and its abdomen chequered with white. The insect has a small head, its antennal bristle being hairy, but naked at the tip. The female is viviparous, the larvæ being hatched within the oviduct. The ovaries often contain as many as 20,000 eggs. The larvæ are footless, white, fleshy, and narrower in front than at the posterior part. The *Calliphora*, or *Vomitoria*, the common large meat-fly, is too well known to require any description; its larvæ are white, and obliquely truncated at the posterior extremity. They have no feet, but have two fleshy horns on the head, and two fleshy hooklets in the mouth. The last segment of the body is provided with eleven points, arranged like rays.

The *Lucilia* is represented by the common bluebottle.

The larvæ of *Dipteræ* develop in seven or eight days in Europe. In the *Muscidæ* the larva changes into a pupa within the larval skin, which contracts into a cylindrical puparium, corresponding in use to the cocoon. The flies almost always deposit their eggs in the light and heat of day.

Symptoms.—After the deposit of the ova, the mucous membrane soon becomes irritable, a constant tickling sensation is felt, and sneezing is a common symptom. In a short time the tickling becomes very troublesome, and a crawling feeling or formication is perceived. This is mostly followed after a short time by a sanious bloody discharge, and epistaxis often occurs. Œdema of the face, and especially of the eyelids, is a characteristic symptom, and swelling of the palate takes place in some cases. Occasionally, but not very frequently, small tumours form over the nose, which open and allow the larvæ to escape. Severe and constant pain is generally felt, especially at the root of the nose and over the frontal region. The headache is often of a throbbing character, and has been described both in India and Cayenne as resembling the sensation which might be caused by repeated blows with a hammer or iron bar. The pain in some cases never intermits, but gives rise to the most distressing sleeplessness; this is, indeed, sometimes so unbearable as to lead to suicide. Larvæ are often sneezed out, or can be seen in the nose crawling about in the fetid mucus. When it is remembered that as many as from two to three hundred maggots are sometimes ejected in a single case, the injury and loss of substance which they can cause will be readily appreciated.[1] Not only is the mucous membrane destroyed, but the cartilages and bones of the nose and head become carious. Convulsions, followed by coma, generally terminate the life of the patient in fatal cases.

---

[1] Linnæus states that "three flies devour the body of a dead horse as quickly as a lion." ("Syst. Nat." Ed. decima tertia. Lipsiæ, 1788, t. i. pars v. p. 2,840. This extraordinary power of destruction

Diagnosis.—Although there are many symptoms which might lead to a suspicion of myasis, it is only the actual finding of maggots which can prove its existence.

Pathology.—The morbid changes produced by maggots have already been described in dealing with the symptoms, and it only remains to be remarked here that in cases which have not been treated sufficiently early, not only the soft tissues, but the ethmoid, sphenoid, and palate bones are often destroyed by caries, and that the meninges are found after death to be much inflamed. There is a section of a skull in the Museum[1] of the Medical College at Calcutta taken from the body of a man who died of "Peenash," in which a large number of maggots were found on the sphenoid and ethmoid bones.

Prognosis.—This disease, if neglected, is probably always dangerous in tropical climates. Its fatality, however, seems to vary greatly in different countries, for whilst Lahory met with only two fatal cases out of ninety-one patients, of six patients seen by St. Pair three died. This discrepancy is perhaps to be explained by many cases having been described under the name of "Peenash," in which no maggots are present—cases, in fact, in which there was syphilitic disease of the nose or merely dry catarrh.

Treatment.—Dauzats's discovery of the highly beneficial effects of chloroform will probably cause this remedy to supersede all others. *Inhalations* of chloroform are often sufficient to effect a cure; but should the maggots resist this mode of administration, the patient should be rendered insensible by the vapour, and then equal parts of chloroform and water should be *injected;* or should even this fail, *pure chloroform may be syringed up the nose.* The undiluted chloroform does not appear to do any harm to the mucous membrane, but it causes extreme pain when the patient is not under an anæsthetic. The remedies formerly used, viz., injection of turpentine, infusion of tobacco and lemon-juice, insufflations of calomel, the local application of Peruvian balsam, though all to some extent efficacious, do not seem to be at all comparable in their effects to chloroform. Consti-

---

is, of course, due to the rapidity with which the insect passes through its successive stages of development, and to the great number of eggs laid in each cycle when the condition of imago is reached.

[1] See "Indian Annals of Med. Sci." Oct. 1855.

tutional treatment must not be neglected: opium should be given to relieve the pain and induce sleep; and if the myasis is complicated by syphilis, iodide of potassium should be administered. Stimulants and highly nutritious food are required to sustain the vital powers.

In the above article the severe nasal affections produced by the larvæ of *Muscidæ* have been considered, and it is only very rarely that other *Dipteræ* deposit their ova within the nose. There are a few cases, however, mostly reported before entomology was studied scientifically, in which the larvæ of the gadfly (*Œstrus ovis*) and of the leather-eater (*Dermestes*) are suppose to have attacked the nose.[1]

The gadfly is a regular parasite of sheep and goats, in the nostrils of which animals the insect constantly lays its eggs. Moquin-Tandon denies that there is any instance on record in which a human being has been attacked; but the following case, reported by Razoux,[2] leaves no doubt as to the occasional occurrence of the accident. A woman was seized with burning fever, inflamed eyes, dry skin, and gradually increasing headache in the frontal region. Tartar emetic was prescribed, to produce vomiting, but with no beneficial result. Attacks of sneezing, however, afterwards came on, and the patient expelled from the nose seventy-two live worms of the gadfly. Quite recently, Kirschmann[3] has reported a case in which a peasant woman was attacked with bleeding from the nose which lasted three days. The blood came from the left nostril, and the corresponding side of the face was enormously swollen. The hæmorrhage was arrested by injections of perchloride of iron, and this treatment was followed by the expulsion of a mass of maggots of the *Œstrus ovis.* The patient made a good recovery. Two cases are on record in which the maggots of the leather-eater are said to have been found in the nose. One[4] was that of a young woman, who complained of great headache, which was entirely relieved by the expulsion of five reddish-brown hairy maggots. The other[1] was that of a man who suffered from excruciating headache, with epistaxis, which lasted three days. After the passage of eighteen small hairy worms from the nose all the symptoms disappeared.

---

[1] A case is recorded by Hope (quoted by Moquin-Tandon: "Elém. de Zoologie Médicale," p. 217) in which it is stated that death resulted from the presence of a mealworm (*Tenebrio molitor*) in the nasal fossæ, but as this maggot is a vegetable feeder the case must be looked upon with doubt.

[2] "Journal de Médecine" (Roux), tome ix. p. 353.

[3] "Wien. med. Wochenschrift." 1881. Dec. 3.

[4] Paullini: "Ephem. Acad. Nat Curios." dec. ii. ann. v. append. p. 63, obs. 101.

ENTOMOZOARIA IN THE NOSE.

This subject belongs to the curiosities of medical literature, rather than to the domain of practical therapeutics, but amongst the entomozoaria which occasionally find lodgment in the nasal passages may be mentioned leeches, ascarides, centipedes, and earwigs.

In former times, when leeches were so largely used, it is highly probable that these animals not unfrequently got up the nose. Their size, however, would render them easily visible, and they were no doubt quickly removed with forceps, or expelled by means of injections. That they did occasionally enter the nose is rendered more than probable by the animated discussions which took place in the fifteenth and sixteenth centuries, as to whether leeches could penetrate from the nose into the brain. There are, however, only two cases on record, so far as I have been able to discover, in which it is actually stated that a leech lodged in the nose. One is that of Lusitanus,[2] in which it is said that a man who suffered severely from headache, after every other kind of treatment had failed, had a leech applied to the anterior part of the nose. The animal accidentally crawled into the nasal passages, and could not be removed, and two days afterwards the man died. In the other case[3] a student, who had suffered for a long time from violent headache, accompanied by epistaxis and sneezing, was relieved of his troublesome complaint by the expulsion of a worm, which closely resembled a leech.

Ascarides are occasionally found in the nose after death,[4] as indeed they are in the larynx and trachea, but in the latter case there is no doubt that the worms creep up into the air-passages from the intestinal canal immediately after the death of the patient, and it is highly probable that the same course of events has taken place when worms have been observed in the nose. There are a few instances, however, on record in which the worms were expelled from the nose during life. Thus Benevenius[1] describes the case of a man who, suffering from delirium and convulsions, appeared about to die, when he expelled a worm of about five inches in length from the right nostril, and made a good recovery. Forest,[2] Lanzoni,[3] Langelott,[4] Tulpe,[5] Fehr,[6] Behr,[7] Bruckmann,[8] Albrecht,[9], Habber,[10] and Lange,[11] have also reported cases in which the *Ascaris lumbricoides* was expelled from the nose.

---

[1] Wohlfahrt: "Observ. de Vermibus per Nares excretis." Halæ Magdeburgicae, 1768, p. 3, et seq. The case is illustrated by some good drawings.

[2] "De Praxi Admirandâ," lib. iii. obs. 61. Amst. 1641.

[3] "Ephem. Acad. Nat. Curios." dec. ii. ann. i. obs. 99.

[4] Troja ("Rarissima observatio de magno lumbrico in frontali sinu reperto et totam ejus cavitatem replente," Napoli, 1771) found a large ascaris occupying the entire cavity in one of the frontal sinuses of a corpse. Wrisberg (in Blumenbach's "Prolusio anatomica de

Numerous instances are on record in which centipedes have lodged in the nose or its adjacent sinuses for months and even years, no less than ten such cases having been collected by Tiedemann.[12] Most of the patients suffered from agonizing headaches, and some from vertigo and trembling. A case occurred in the practice of Maréchal, of Metz,[13] in which a centipede measuring six centimetres in length was expelled from the nose. The patient was a farmer's wife, who had suffered from formication in the nostrils, and a copious discharge of mucus, often fetid and mingled with blood, and from severe headaches, the sensation being compared by the woman to repeated blows

---

sinibus frontalibus," Gottingæ, 1779, p. 425) also found a similar specimen. Deschamps ("Maladies des Fosses nasales," 1804, p. 307) has also reported a case in which an *Ascaris lumbricoides* was found in the antrum after death.

[1] "Med. Obs. Exempl." Coloniæ. 1581.

[2] "Obs. et Cur. Med." lib. xxvii. obs. 28. p. 351.

[3] "Ephem. Acad. Nat. Curios." dec. iii. ann. ii. obs. 38.

[4] Thomæ Bartolini: "Epist. Med." Cent. ii. epist. 74, p. 640.

[5] "Observat. Med." lib. iv. cap. 12.

[6] "Ephem. Acad. Nat. Curios." dec. iii. ann. iii. p. 261.

[7] "Act. Physico-Med. Acad. Nat. Curios." t. iv. obs. 30, p. 111.

[8] "Commer. Noricum." t. ix. ann. 1739, art. i. p. 113.

[9] "Act. Physico-Med. Acad. Nat. Curios." t. iv. obs. 51, p. 158.

[10] "Haarlem Verhadl." Bd. x. Heft 2. p. 465.

[11] Blumenbach's "Medizinische Bibliothek." Göttingen, 1788, Bd. iii. p. 154.

[12] "Würmer in den Geruchsorganen." Mannheim, 1844.

[13] Moquin-Tandon, p. 217. See also Coquerel, loc. cit. p. 525. A similar case will be found reported in the "Hist. de l'Acad. des Sciences." Paris, 1709, p. 42.

with a hammer. She was also troubled with constant lachrymation and vomiting. The unfortunate patient often passed into a state of extreme excitement, and the least noise caused her great torture. There were periods of remission, but she had five or six severe attacks every day, and several during the night. One of them, however, lasted fifteen days without ceasing. The centipede was expelled alive after a year, and was pronounced to be a *Scolopendron electricum.*

Earwigs being only found in cool climates, and then only in the autumn months when few people live out of doors, seldom have an opportunity of finding their way into the nose. The only case with which I am acquainted is that of Sandifort,[1] in which a woman very fond of smelling strongly-scented flowers was suddenly attacked by great pain in the forehead on the right side, whilst at the same time a fetid discharge from the nose came on. After inhaling hot steam she expelled a live earwig, when the pain and discharge soon ceased.

The symptoms caused by the various entomozoaria usually consist in sleeplessness, pain in the lower part of the forehead, sanious discharge from the nose, vomiting, lachrymation, and in some cases great cerebral excitement. Sternutatories generally effect a cure, and in one or two instances the expulsion of the worm took place after spontaneous sneezing. Occasionally, however, when these animals enter the frontal sinus, it may be necessary to trephine the bone, and Morgagni[2] reports a case in which Cæsar Magatus performed this operation successfully.

ANOSMIA.

Latin Eq.—Odoratus perditus.
French Eq.—Perte de l'odorat.
German Eq.—Verlust des Geruchsinns.
Italian Eq.—Perdita del odorato.

DEFINITION.—*Loss or impairment of smell primarily dependent on disease of the olfactory nerves or lobes, or of their cerebral centres.*[3]

---

[1] "Exercitatio Acad. Lugd. Bat." 1785. lib. ii. cap. xvii. p. 130. "De forficulâ vivâ naribus excussâ."

[2] "De sed. et caus. morborum," lib. i. art. ix. Lugd. Batav. 1767, t. i. p. 12.

[3] A remarkable case has been reported by Bérard ("Journal de Physiologie expérimentale et pathologique," 1825, t. v. p. 17, et

History.—Several cases of anosmia, congenital and acquired, were collected by Bonet,[1] and in 1751 a thesis on loss of smell was written by Bauer;[2] whilst at the beginning of the present century Deschamps[3] recorded some curious instances of the affection. The whole subject was treated in great detail by Cloquet[4] in 1821, in a work specially devoted to the sense of smell. A very striking instance of the destruction of the sense by too powerful stimulation was reported by Graves[5] in 1834, and soon afterwards a case of congenital absence of the olfactory nerves, with complete anosmia, was published by Pressat.[6] Some careful observations on senile atrophy of the olfactory nerves were made by Prévost[7] in

---

[1] "Sepulchretum." Genevæ, 1700, t. i. p. 441, et seq.

[2] "De odoratu abolito." Altorfii Noricorum, 1751. Sometimes quoted as the work of Jantke, under whose presidency it was delivered.

[3] "Maladies des Fosses nasales." Paris, an xii. [1804] p. 56.

[4] "Osphrésiologie." Paris, 1821.

[5] "Dublin Journ. of Med. Sci." 1834, No. 16.

[6] "Obs. d'un Cas d'Absence du Nerf Olfactif." Thèse de Paris, Dec. 15, 1837.

[7] "Gazette Médicale." 1866, No. 37, p. 597, et seq.

---

seq.), in which it is asserted that in the case of a man whose sense of smell had been perfect, there was nevertheless found after death complete destruction, not only of the olfactory nerves, but also of the olfactory lobes, of the pedicles which unite them to the surface of the hemisphere in front of the Sylvian fissure, of the fissure itself, and in short, thorough disorganization of the whole olfactory region. The grounds on which it is maintained that the patient retained his sense of smell are, first, that he was able to appreciate the difference between various kinds of snuff; and, secondly, that he was annoyed by the stench of an abscess from which a patient in the next bed was suffering. This evidence, however, appears to me to be inadequate; the pleasurable sensation produced by snuff mainly depending on its stimulating effects on the fifth nerve, the functional activity of which is apparently intensified when that of the olfactory nerve is abolished (see foot-note 1, p. 467). It is more difficult to explain away the patient's dislike of the stench from the abscess, but it is possible that he objected to his neighbour on other grounds than those of smell. *It appears that the sense of smell was never actually tested during life*, and this fact, to my mind, entirely destroys the value of the observation. Desmoulins, in commenting on the above case, adds (loc. cit. p. 17) an account of a patient who had lost his sense of smell on one side, although the olfactory nerves, lobes, pedicles, and the adjacent parts of the brain were perfectly sound. On the same side the ganglion of the fifth nerve had undergone degeneration, the grey matter having been destroyed, and the nerve filaments softened and altered. It is not stated what tests were used in this case for ascertaining the condition of the patient's sense of smell; but, if ammonia or some other pungent vapour was employed, as was commonly done at that time, the fallacy of the experiment is obvious. Althaus has published a very complete and instructive case ("Med.-Chir. Trans." 1869, vol. lii. p. 27, et seq.), in which the mucous membrane of the nose was absolutely insensible to the contact of blunt or even sharp instruments, and no sneezing was brought on by snuff, yet the sense of smell was perfectly normal, the patient having no difficulty whatever in recognizing the different varieties of scents with which he was tested.

1866 ; and an essay on various affections of the sense of smell, and the causes producing them, was written by Notta[1] in 1870. In the same year an elaborate article on anosmia was published by William Ogle.[2] The subject has recently been treated of by Althaus.[3]

[1] "Arch. Gén." 1870, t. i. p. 385, et seq.
[2] "Med.-Chir. Trans." 1870, vol. liii. p. 263, et seq.
[3] "Lancet." May 14 and 21, 1881.

Etiology.—Any disease or injury of the olfactory nerves, tracts, or centres, is likely to interfere with the sense of smell, but for the satisfactory discharge of the function it is necessary that certain secondary conditions should be maintained. Not only is the integrity of the fifth and seventh nerves essential, but there must not be any mechanical obstruction which prevents the odorous particles from reaching the olfactory region, and the Schneiderian membrane must possess its normal moisture of surface. Further, it is highly probable that the presence of pigment in the cell-processes of Schultze is a necessary condition of healthy olfaction.

Cases are on record in which the exposure of the olfactory nerves to the prolonged action of an exceedingly disagreeable smell appears to have been the cause of injury to the function of this nerve, and it is not improbable that the mode of action of the odour consists in over-stimulation, in the same way that strong light sometimes produces amaurosis. A remarkable case of this sort has been recorded by Bauer,[1] in which a surgeon, who dissected a very putrid body, lost the sense of smell for the rest of his life. Graves[2] has reported an instance in which, during the Irish rebellion of 1798, an officer had to take charge of some soldiers who were engaged for many hours searching for pikes supposed to have been concealed in a very offensive sewer. Next day he perceived he had lost his smell. It might be thought that scavengers would sometimes suffer in a similar manner, but, from inquiries I have made, this does not appear to be the case. The explanation probably lies in the fact that when sewers are at all foul the workmen remain in them only a very short time.[3] The inhalation of strong fumes of ammonia, or other irritant vapours, may likewise affect the terminal twigs of the olfactory nerves in such a way as seriously to impair their function. Snuff-taking sometimes acts in a similar manner.[4] I have seen two cases in which the use of the nasal douche has been followed by permanent anosmia. Wendt[1] refers to three cases within his own knowledge in which the sense of smell was permanently destroyed by the local use of solution of alum. Stricker[2] has reported a case in which the action of sulphuric ether appeared to destroy the function of the olfactory nerves. the patient having been an entomologist, who spent many hours daily in preparing insects which he killed with that vapour. Loss of smell sometimes follows frontal neuralgia,[3] and a case was observed by Maurice Raynaud,[4] in which the loss of function was distinctly periodic, the patient having been a woman, aged thirty-eight, who suffered from anosmia every twenty-four hours from 4 p.m. one day to 10 a.m. the next. She rapidly recovered under the use of quinine. This patient was not in the least degree hysterical, but had previously suffered from crural neuralgia, which had also been cured by quinine. The most common cause of anosmia is prolonged catarrh,[5] few practitioners having failed to meet with some examples. In these cases the cell-processes of Schultze are probably destroyed by cirrhotic shrinking of the inflammatory exudation. A remarkable case has been recorded by J. P. Frank,[6] but without details, in which he affirms that "loss of smell and taste occurred in a man from a deposit of rheumatic (?) matter on the nose and tongue." Unless this was a case in which a diphtheritic membrane was deposited, it is difficult to understand its nature.

---

[1] Op. cit. p. 188.

[2] "Dub. Journ." 1834. No. 16.

[3] A superintendent of sewers, who had spent a large portion of his life underground, once informed me that the sewers were generally far sweeter than most private houses.

[4] "Virchow's Archiv." 1868. Bd. xli. p. 290.

Owing to the extremely soft consistence of the olfactory bulbs, they are occasionally separated from the brain by falls on the head. Sometimes these accidents are accompanied by concussion of the brain, and the anosmia is associated with deafness, ringing in the ears, or even bleeding from one ear: in these latter cases there is probably a fracture of the base of the skull, but in other instances temporary abolition of consciousness and loss of smell are the only symptoms. Such cases are by no means rare, and several have been described by Notta.[7] One instance of this kind has come under my own notice, the patient having been a surgeon, who was thrown from his gig with considerable force, and alighted on his head. He was stunned for a few minutes, and the next day became aware that he had lost his sense of smell. Although this gentleman subsequently recovered his health completely, the anosmia was permanent.

---

[1] "Ziemssen's Cyclopædia," vol. vii. p. 56.

[2] "Virchow's Archiv." 1868, Bd. xli. p. 290.

[3] Notta: "Archives Gén." 1870, vol. i. p. 385, et seq.

[4] "Union Médicale." July 10, 1879.

[5] "Ephem. Nat. Curios." dec. iii. ann. iv. obs. 3.

[6] "De Curandis Hominum Morbis." Mannhemii, 1793, lib. v. p. 132.

[7] Loc. cit. See also a case "Ephem. Nat. Cur." ann. iv. obs. 3.

Long-continued paralysis of the fifth nerve interferes with the proper nutrition of the mucous membrane, and peripheral changes of a secondary character may then take place in the olfactory nerves, and thus cause true anosmia. In cases of paralysis of the seventh nerve (portio dura) the patient is unable to smell, for two reasons—first, because he is unable to sniff up the olfactory particles; and, secondly, because the orbicularis muscle of the eye being paralysed, the conjunctival fluid overflows on to the cheek instead of passing through the lachrymal duct, causing dryness of the nasal mucous membrane, and so destroying the receptivity of the olfactory nerve.

The influence of obstruction in interfering with the function of smell is seen in the case of polypi and of swelling of the mucous membrane of the nose. When the obstruction, however, is due to nasal or naso-pharyngeal growths, or to adhesions which block up the posterior nasal openings, the patient can smell odorous substances placed near the nostrils, though in eating he can no longer appreciate flavours, and he therefore thinks he has lost his sense of taste.

Moisture of the mucous membrane of the nose is as essential to the sense of smell as that of the tongue is to taste. The influence of the seventh pair of nerves in indirectly causing dryness has already been pointed out, and it is only necessary here to call attention to the arrest of secretion in the first stage of nasal catarrh, which often gives rise to temporary anosmia.

The presence of pigment in immediate contact with the cell-processes of Schultze is probably essential to olfaction in many animals, but, as far as I am aware, Hutchison's[1] case is the only one on record which supports this view as regards the human subject. The patient was a young negro in Kentucky, whose parents were both black, and who up to his twelfth year had the usual dark skin of an African. At this period a white patch appeared near the left eye, which in ten years extended all over the body, so that had it not been for his woolly hair the young man might have been taken for a very fair European. When he first began to change his colour, his sense of smell was weakened, and by the time he had become white olfaction was almost completely lost. This case was passed over as a mere medical curiosity until its importance was recognized by William Ogle.[1] Althaus[2] has recorded the case of a well-known statesman who is an Albino, in whose case smell had always been weak, and who lost this sense entirely at the age of sixty-three. Althaus regarded the case as one of "ultimate atrophy of a nerve which had never been highly developed." It appears from the researches of Ogle[3] that the pigmentation of the olfactory region is darkest in those animals which have the most acute sense of smell, and that in the coloured races of men this sense acquires a much greater degree of perfection than in the white man. He further points out that it has often been observed that white animals, owing to their defective sense of smell, are more liable than those of a dark colour to eat poisonous herbs.[4] Thus, in some parts of Virginia, white pigs are poisoned by the roots of the *Lachnanthes tinctoria*; whilst in the Tarantino, the inhabitants only rear black sheep, because the white ones are poisoned by eating the abundant *Hypericum crispum* of that region. It is stated also that the white rhinoceros perishes from eating the *Euphorbia candelabrum*, which the dark rhinoceros refuses.

---

[1] "Amer. Journ. Med. Sci." 1852, vol. xxiii. p. 146, et seq.

The sense of smell generally becomes impaired in the decline of life—a change probably resulting from atrophic degeneration of both the nerve centre and its periphery.

Defective olfaction is probably sometimes hereditary,[5] and cases of congenital deficiency of the sense of smell have been recorded by Frankenau[6] and Notta.[7] It is not improbable that in some of these instances the cause of anosmia was prolonged nasal catarrh in infancy; but this explanation does not always apply, for congenital deficiency of the olfactory nerves has sometimes been observed (see Pathology).

---

[1] "Med.-Chir. Trans." 1870, vol. liii. p. 276.

[2] "Lancet." 1881, vol. i. p. 813.

[3] Loc. cit. p. 278, et seq.

[4] Loc. cit. pp. 281, 282.

[5] Breschet: "Dict. des Sciences Médicales." 1819, vol. xxxvii. p. 241.

[6] "Ephem. Nat. Curios." dec. iii. ann. iv. obs. 3.

[7] Loc. cit.

In conclusion it must be admitted that there are some cases of anosmia in which it is impossible to discover any cause for the loss of function. Several instances of this kind have been reported by Notta, under the term of *anosmie essentielle*.

Symptoms.—*Taste* is so closely associated with *smell* that it is necessary to make a few observations on the subject of these two senses.

The recognition of the bitter, sweet, salt, and acid characters of food by the tongue and fauces constitutes taste. The appreciation of the *savour* of meat, the *flavour* of fruit, and the *bouquet* of wine, depends entirely on smell. It is necessary to call attention to these facts, because the mistake is not unfrequently made by medical writers, of describing cases as loss of taste, when it is clear from the context that they mean loss of smell. But whilst taste is rarely impaired, smell is often altogether lost, and the acuteness of the sense varies very much in different people. It is generally somewhat feeble in young children, attains its greatest vigour in adult life, and, as already remarked, becomes dull in old age. It is only when the sense of smell is completely lost that the power of distinguishing flavours is destroyed; people who have no perception of odours diffused in the atmosphere often retaining a keen relish for savoury food. Loss of smell may be either unilateral or bilateral, and in the former case it may be of import as indicating localized lesion of the brain, or some disease in the upper part of one of the nasal channels.

It has been remarked that in cases of anosmia the sensibility of the mucous membrane to irritants has sometimes become even more acute than it was whilst the olfactory nerves were in a healthy condition.[1]

Pathology.—The pathology of anosmia is still very obscure, though there are a number of scattered observations on the subject. A remarkable case has been related by Bonet,[2] in which a man who had suffered towards the end of his life from headache, together with blindness and loss of smell, was found after death to have an abscess involving the olfactory bulbs. In a second case, recorded by the same author, an abscess was found involving the olfactory bulbs and causing erosion of the frontal and ethmoid bones. The patient was a man aged twenty-two, who, shortly before death from convulsions, had suffered from headache, blindness, and loss of smell. This was, no doubt, an example of syphilitic disease of the bones. It is more difficult to explain the pathological nature of the following case, which is also reported by Bonet[1]:—"A 'stone,' flattened like a coin but not so round, and of an ashy colour, was found at the base of the brain, pressing on the sphenoid (*sic*) and olfactory nerves." The patient in whom this was observed had been attacked with fever, accompanied by severe pain and heaviness in the head, and had died nine days after the commencement of the illness. I feel quite unable to make any suggestion as to the nature of the "stone," but the case seems worthy of mention as being the record of a fact by an accurate observer.

---

[1] See a case related by Deschamps ("Maladies des Fosses nasales," Thèse de Paris, 1804, p. 56), in which a student who had totally lost his sense of smell became, after a time, able to distinguish one kind of snuff from another, simply from their different degrees of pungency.

[2] "Sepulchretum." Genevæ, 1700, lib. i. sec. xx. obs. 1, p. 411.

As the olfactory nerve-tract can be traced to the island of Reil,[2] to a point not far from Broca's convolution, it might be expected that in aphasic patients anosmia would be often present. But although such cases have been reported by Fletcher,[3] Hughlings-Jackson,[4] and Ogle,[5] the association of these symptoms does not appear to be common. The statistics of Ball and Krishaber,[6] indeed, tend to show that disease of the left side of the brain does not frequently cause anosmia, but that it is more common when the lesion is in the right lobe. Thus, out of seventy-five cases in which there was a tumour in the left side of the brain, there was not a single instance of anosmia, though aphasia was present in seventeen. On the other hand, out of sixty-three cases of tumour affecting the right side, in three of which aphasia was a symptom, anosmia was observed in two. Further, out of forty-seven cases of cerebral tumour, where the growth was median or bilateral, or where the exact situation was not stated, there were four cases of loss of smell; but it is not recorded that anosmia and aphasia coexisted. Although it is evident, from the above statistics, that anosmia is sometimes caused by the pressure of tumours in the brain, it is remarkable that abscess in the cerebral substance very seldom interferes with the function of the olfactory centre, for out of eighty-nine cases of this affection collected by Ball and Krishaber,[1] in thirty-eight of which the left side of the brain was affected, anosmia was not present in a single instance. In connection with aphasia, it must not be forgotten that anosmia, unless specially looked for, would be very likely to escape notice. The fact that the loss of smell in these cases is only unilateral would probably prevent the patient noticing it, but even were it to be observed by him, his limited powers of articulate expression would probably prevent his calling attention to it. In connection with this subject, it may be mentioned that Hughlings-Jackson[2] has shown that plugging of the anterior cerebral, or possibly of the middle cerebral artery, sometimes gives rise to anosmia.

---

[1] Op. cit. obs. 4. p. 443.

[2] The experiments of " Ferrier ("Functions of the Brain." London, 1876, p. 184), tend to show that the olfactory centre is situated at the tip of the temporo-sphenoidal lobe—the faradization of this spot in animals being followed by a sniff which is evidently the outward expression of the excitation of the centre. Not only does destruction of this part seem to cause loss of smell, but it is observed to be much developed in animals which have a keen sense of smell. Injury of the external olfactory tract, which is lost in the island of Reil, has been shown by Serres ("Anat. Comp. du Cerveau." t. i. p. 295), in nineteen post-mortem examinations of paralytic patients, to be associated with loss of smell in a much more marked manner than injury of the internal tract.

[3] "Brit. Med. Journ." April, 1861.

[4] "Lond. Hosp. Rep." vol. i. p. 10.

[5] Loc. cit. p. 273, et seq.

[6] "Dict. Encyclop. des Sci. Méd." Paris, 1873, t. xiv. p. 456.

Prévost[3] has reported fourteen cases in which he had examined the olfactory nerves after death. In six of these the sense of smell had not been tested during life, and no conclusion, therefore, can be drawn from the observations. In four others, in which it had been absent or deficient for some time before death, there was found distinct degeneration of the nerve-tissue of the olfactory bulbs. In the remaining four cases, however, similar pathological changes were discovered in the nerves, although the sense of smell had been proved during life to be perfectly sound.

Congenital absence of the olfactory nerves has been observed by Bonet,[4] Rosenmüller,[5] and Pressat.[6] In Pressat's case, at the post-mortem examination of a patient who during life never had any sense of smell, it was found that there was complete absence of the olfactory nerves, and not even a trace of the bulb or roots could be discovered. The brain in the immediate neighbourhood was quite healthy, and no other nerves were wanting. On the left of the crista galli there was a groove, but on the right side there was no trace of this. The ethmoid did not present the usual perforations, there being only a single small aperture on the left side near the ethmoidal fissure, where the nasal branch of the fifth nerve passed through. There was no alteration of any kind affecting the pituitary membrane. The case related by Bonet is somewhat analogous in character, and it possesses additional interest as being quoted from Schneider. In this instance the patient was a young man who had suffered from congenital anosmia, and it was found after death that the olfactory nerves did not send any branches to the pituitary membrane. The same author records a second case[1] in which, in the case of a man who had no smell, the olfactory nerves were absent.

---

[1] Op. cit.

[2] "Lond. Hosp. Reports." 1864, vol. i. p. 410.

[3] "Gaz. Méd." Sept. 15, 1866, No. 37, p. 597, et seq.

[4] "Sepulchretum." Genevae, 1700, lib. i. sect, xx. obs. 2.

[5] "De Defectu Nervi Olfactorii." Leipzig, 1817.

[6] Op. cit.

Diagnosis.—It is very important to differentiate the various forms of anosmia. Mechanical obstructions can be easily recognized with the help of the speculum and mirror, and in most of the cases of a neurotic character there are associated symptoms which point to the real nature of the affection. In all cases where the patient complains of impairment of smell, the function should be tested by first closing one nostril, and then the other, when it will at once be ascertained whether the sense is destroyed on one side, or blunted on both; and it should be remembered that in loss of smell dependent on injury to the seventh or fifth nerves the affection is almost always unilateral.

In testing the smell the patient should not be allowed to know what scent is presented to his nostrils, but at the same time it is important that the test-odours should be familiar. Oil of cinnamon, oil of peppermint, turpentine, valerian, or a well used tobacco-pipe will be found to serve the purpose well.

Prognosis.—The prospect of restoration of function depends, of course, on the nature of the lesion. Where there is cerebral disease the sense of smell is seldom recovered. Notta[2] has pointed out that, strange as at first sight it may appear, in anosmia resulting from injury of the head the sense of smell is more often restored when the associated lesions have been severe—that is to say, when there has probably been fracture of the base of the skull—than when the accident has apparently been less violent. The explanation is to be found in the fact that anosmia following a comparatively slight injury is likely to be due to separation from the brain of the olfactory bulbs, a condition which, of course, is irreparable.

---

[1] Op. cit. lib. i. sect. xx. obs. 3.

[2] Loc. cit.

Where anosmia is dependent on catarrh, a favourable prognosis may be given, but I have never known recovery to take place in such cases where loss of smell has existed for two years or more. Where, however, the loss of smell is simply the result of mechanical interference with the conditions necessary for the proper exercise of the function, as in the case of polypi and other growths, the sense, in most cases, will be restored when the obstruction is removed, even after a lapse of many years. Bauer[1] has reported a case which came under his own notice, in which a man who had lost his smell for fifteen years suddenly recovered it after a voyage. The cause of the anosmia is not stated.

Treatment.—In true anosmia—that is to say, in loss of smell dependent on loss of nerve-power—no treatment has hitherto proved of any avail. In cases of cerebral injury or disease, or when the continuity of the nerve is interrupted, it is obvious also that nothing can be done. Where the function of the nerve is merely blunted, however, benefit may be looked for from therapeutical measures. Beard and Rockwell[2] have met with success from galvanism, applied both inside and outside the nose; but though I have employed this treatment in favourable cases, such as loss of smell after prolonged catarrh, I have never found it do any good. Althaus[3] has found that a very powerful current is required to stimulate the olfactory nerve, no less than thirty-five plates being necessary to obtain any response. This, by affecting the contiguous nerves, causes extreme pain, dazzling flashes of light, a hissing noise like that of a steam-engine, together with faintness and giddiness—a condition which is really worse than the original complaint. Hence this treatment cannot be recommended. The insufflation of a powder containing one-twenty-fourth of a grain of strychnia with two grains of starch, twice a day, will sometimes do good. If no effect is produced, the strychnia may be increased to one-sixteenth or one-twelfth of a grain. This remedy, which was originally recommended by Althaus,[4] has twice proved of service in my hands. Should the anosmia be intermittent, quinine should, of course, be given, as in the case reported by Maurice Raynaud.[1]

---

[1] "De Odoratu Abolito." Altorfii Noricorum, 1751, p. 192.

[2] "Practical Treatise on the Med. and Surg. Uses of Electricity." London, 1881, 3rd ed. pp. 616, 617.

[3] "Lancet." 1881, vol. i. p. 772.

[4] Ibid. p. 815.

PAROSMIA.

The subjective perception of a disagreeable odour is not very uncommon. It is often a species of epileptic *aura*, and this doubtless results, as Althaus[2] remarks, in certain cases, from disturbances in the olfactory centre, and subsequent extension of the morbid impression to the motor centres. Parosmia is often met with in lunatics, although in them, as Schlaeger[3] has pointed out, the apparent hallucination often really depends on a lesion involving the olfactory centre. A case reported by Lockemann[4] furnishes a good illustration of this condition. The patient was a woman aged fifty-five, who, after suffering from giddiness and epilepsy for a year began to notice that immediately before a seizure she experienced sensations of "indescribable" smells, which were sometimes agreeable in character, and which ceased when the fit was over. This symptom gradually disappeared in the course of a few months, and, till the death of the patient from coma two years later, nothing peculiar as regards the sense of smell was observed. The autopsy revealed a carcinomatous tumour about the size of a duck's egg in the left cerebral lobe. This growth had destroyed every vestige of the left olfactory tract. There can be no doubt that towards the end of her life this patient suffered from unilateral anosmia, although the symptoms escaped observation. In a somewhat similar case related by Sander,[5] a man aged thirty-three was subject to epileptic fits, which were ushered in by an excessively disagreeable smell. Symptoms of insanity came on after a time, and before death the patient became totally blind. The post-mortem examination showed that a glioma of the size of an apple was situated on the under surface of the left temporal lobe, extending into its substance for a depth of two inches and a half. The growth also reached the under part of the frontal lobe, and the posterior part of the left olfactory tract was lost in it. It is not clearly stated whether the parosmia occurred only in the first attacks, or whether it was a constant precursor, as in Lockemann's patient above mentioned. A case was recorded by Whytt,[1] which has been often referred to by subsequent writers. The subject was a boy aged ten, who, *between* attacks of hystero-epilepsy, used to complain of a peculiar smell; but as the lad had at the same time a purulent discharge from the nose, I do not think the case deserves the consideration it has received. Westphal[2] has reported a much more pertinent example of parosmia, which occurred in a syphilitic patient who suffered from convulsions. In this instance, at the autopsy, the olfactory bulb was found "adherent," and near it were seen two small gummata on the pia mater. In the case of a lunatic, related by Schlaeger, the patient had complained of disagreeable smells for many years, and after death a fungous tumour of the dura mater was found on the cribriform plate of the ethmoid. A patient referred to by Hughlings-Jackson[3] used to be troubled with the smells as the epileptic fit was passing off.

---

[1] Loc. cit.

[2] "Lancet." 1881, vol. i. p. 814.

[3] "Zeitschr. d. Gesellschaft. d. Aerzte zu Wien." 1858, Nos. 19 and 20.

[4] "Zeitschr. f. rat. Med." 1861, 3 Reihe, xii.

[5] "Archiv f. Psychiatrie." 1873–74. Bd. iv. p. 234. et seq.

Perversion of the sense of smell, however, is not uncommonly met with in persons in whom there is not the slightest evidence of disease of the nervous centres. Sometimes the disagreeable smell is constantly present, but in other instances it is provoked by substances the odour of which is generally considered to be agreeable, or at any rate indifferent. In a patient recently under the care of Sir William Jenner and myself the smell of cooked meat was so exactly like that of stinking fish that scarcely any animal food could be taken. The patient was a lady of about fifty years of age, in whom the menstrual function still continued active. She was a person of remarkable vigour, both of body and of mind, fond of outdoor exercise, and never having shown the least sign of hysteria. She was under treatment for several months. After a time the digestion became upset, and the function of the liver was somewhat disturbed; but these symptoms appeared to depend on the patient's inability to take proper food, and were the result rather than the cause of the parosmia. Every kind of local and constitutional treatment was tried. After some months complete recovery took place, but I could not attribute it in any way to the remedies.

---

[1] "Observations on the Nature, Causes, and Cure of those Disorders which have been commonly called Nervous." Edinburgh, 1765, p. 141, et seq.

[2] "Allgem. Zeitschr. f. Psychiatrie." Bd. xx. p. 485.

[3] "Lancet." Jan. 21, 1866.

In persons otherwise perfectly healthy, permanent abnormalities in the sense of smell may sometimes be observed. Thus a leading member of our profession has informed me that violets always smell to him exactly like phosphorus, and I know of another person to whom mignonette has the odour of garlic. It is not improbable that an affection of the olfactory sense, analogous to colour-blindness, may occasionally exist.

Anomalies in the function of smell are probably sometimes due to inflammatory changes in the olfactory nerve itself, or to conditions corresponding to neuralgia in a nerve of common sensation. A very remarkable example was published several years ago by Robertson,[1] in which the patient, a woman, aged fifty, a week after the removal of a cataract from her right eye, began to suffer from inflammation of the iris and choroid. This was followed by subjective sensations of smell of the most disgusting nature, a symptom which was at once relieved by a hypodermic injection of morphia. An instance has been related by Althaus,[2] in which a patient, after exposure to cold, was startled by perceiving a strong smell of phosphorus, which overpowered all other accidental smells, and never left him for six weeks. At the end of that time he noticed that he had become insensible to odours of any kind, though the function of the fifth nerve was still quite unimpaired. Symptoms of locomotor ataxy gradually came on, and the patient died eight years after the commencement of his illness. The olfactory lobes showed the naked-eye appearances of neuritis, but through an unfortunate accident they were not submitted to microscopic examination.

No rules can be laid down for *treatment*, the great variety of the diseased conditions giving rise to parosmia, making it necessary to adopt different measures according to the circumstances of the case.

DISEASE OF THE FIFTH NERVE, OR ITS NASAL BRANCHES.

When the fifth nerve or its nasal branches are injured or diseased, the mucous membrane of the nasal fossæ loses its sensibility. Under such circumstances a pungent vapour, such as ammonia or ether, is not perceived, and does not give rise to the reflex phenomenon of sneezing. On the other hand, when these nerves are subjected to abnormal irritation, excessive sneezing may take place. In ordinary catarrh there is no doubt that irritation of the branches of the fifth nerve occurs, and that the hyper-secretion taking place is the effect of vaso-motor paralysis. A really typical example of the affection, however, has been related by Althaus,[1] in which the complaint was purely neurotic in character.

---

[1] "Boston Med. and Surg. Journ." 1873, vol. lxxxix. p. 280.

[2] "Lancet." 1881, vol. i. p. 814.

The *treatment* of conditions, the cause of which is so obscure, is not very hopeful. In the case of deficient sensibility, however, some good may possibly be done by frequent mild applications of the galvanic current directly to the mucous membrane. The therapeutics of catarrh have been already fully discussed (p. 290, et seq.), whilst for nervous sneezing, I can only suggest large doses of bromide of potassium, combined in some cases with insufflations of morphia.

---

[1] "Med.-Chir. Trans." 1869, vol. lii. p. 27, et seq.

CONGENITAL DEFORMITIES OF THE NOSE.

Latin Eq.—Deformitates nasi ingenitæ.
French Eq.—Vices de conformation du nez.
German Eq.—Missbildungen der Nase.
Italian Eq.—Vizi di conformazione del naso.

DEFINITION.—*Congenital deviation from the normal shape of the nose, consisting in the absence or reduplication of the whole organ, or any of its constituent parts, or in complete or partial closure of its canals.*

History.[1]—The only case on record, so far as I am aware, of complete absence of the nose, is one reported by Maisonneuve.[2] The patient was a girl, who, when first seen by that surgeon, at the age of seven months, presented the following anomaly:—The nose was represented by a flat surface pierced only by two round holes, each being scarcely one millimetre in diameter. These apertures were three centimetres apart. It is not stated whether the internal structures of the nose were normal, or whether there was any coexisting deformity of any other part of the body.

The septum is sometimes altogether wanting. An instance of complete absence of this partition in a stillborn fœtus was published by Fernet[1] in 1864. In this case the floor of the nose was also partly deficient, the palate being cleft in its whole length. There was besides double harelip, and the eyeballs and optic nerves were absent. The posterior lobes of the brain were atrophied, and each hand and foot had six digits. The septum occasionally presents a deficiency of substance in one spot, so that the two nasal fossæ communicate through a congenital aperture; cases of this kind have been recorded by Portal,[2] Hildebrandt,[3] and Hyrtl,[4] who states that he has met with the abnormality three times in the course of his "anatomical life." Zuckerkandl,[5] however, who says that he found a hole in the cartilaginous part of the septum eight times in one hundred and fifty bodies, holds that the opening is not caused by arrest of development, but is really a loss of substance due to previous perichondritis.

---

[1] In dealing with the history of the subject, the bibliography has not been treated in the usual chronological method, but the few scattered cases on record have been reproduced in the order in which they are referred to in the *Definition*.

[2] "Bull. Gén. de Thérapeutique." 1855, t. xlix. p. 559.

A remarkable example of congenital deformity of the nose was reported by Thomas,[6] in 1873. The patient was a boy three months old, born of healthy parents who had previously had several perfectly formed children. On the right side of the face there was a triangular opening with somewhat rounded base, which corresponded to the anterior orifice of the nasal fossa, the apex reaching beyond the inner angle of the eye almost to the upper border of the orbit. The cavity of the right fossa was thus exposed as high as the root of the nose. The opening was bounded *externally* by the integuments of the cheek and eyelids, which were continuous with the nasal mucous membrane, *internally* and *above* by the skin of the nose, which also was continuous with the mucous membrane at the edge of the cleft, whilst lower down the opening was bounded on its inner side by the mucous membrane of the right *ala nasi*, which was turned inwards and upwards. Through the fissure could be seen the lower spongy bone, the upper and inner part of which was adherent to the internal surface of the everted ala. The right eye and orbit were normal, but the inner extremity of the lower eyelid with the *caruncula lachrymalis* was half a centimetre lower in level than the corresponding part on the left side. As the upper eyelid was normal in direction, there was thus a gap between the right eyelids at the inner canthus of more than a centimetre in width. This gap was bridged over by a strip of skin about three millimetres wide, which separated the eye from the nasal fissure. Along the middle line of the nose there was a raphe projecting to the extent of about one millimetre, which seemed to mark the line of union of parts originally separate. There was no deformity in any other region of the body. In 1859 Hoppe[7] reported a case of congenital malformation of the nose, in which there was a furrow along the middle line, the nasal bones being entirely absent. Their place was occupied by two cylindrical pieces of cartilage, and a fissure existed along the middle of the nose from the root to the tip, where there were two round knobs. The nostrils were well formed and properly separated.

---

[1] "Bull. de la Soc. Anat." 1864. 2e série, t. 9. p. 130.

[2] "Cours d'Anat. Médicale." Paris, 1804. t. iv. p. 481.

[3] "Lehrbuch der Anatomie des Menschen." Wien, 1802. vol. iii. p. 162, § 1647, foot-note. This writer, who was professor of anatomy at Göttingen, states that he himself had a congenital hole in the cartilaginous part of his septum large enough to admit a pea.

[4] "Lehrbuch der Anatomie des Menschen." Wien, 1882, pp. 576, 577.

[5] "Normale und pathol. Anatomie der Nasenhöhle." Wien, 1882, pp. 99, 100.

[6] "Bull. de la Soc. de Chir." 1873. 3e série, t. 2, p. 162.

[7] "Med. Zeitung des Ver. f. Heilk. in Preussen." 1859, p. 164.

Quite recently, Lefferts[1] has described a case of double septum in a man aged twenty-five. The upper half of the posterior edge of the partition was divided in the vertical direction into two distinct portions, which were separated widely enough to admit the end of a lead pencil between them. The space thus enclosed was triangular in shape, the widest part being above, and the mucous membrane covering it had a natural appearance.

A case of double nose was related by Borelli,[2] but without sufficient anatomical details to establish the true character of the malformation. Although many of the cases reported by the earlier medical writers are undoubtedly fabulous, still a positive statement of fact by so celebrated a man is not to be too lightly dismissed. It is obvious, however, that a vague expression like *nasus duplex* might refer to a lipomatous tumour or elephantiasis, as well as to a veritable double organ.

Cases of congenital occlusion of the posterior nares have been reported by Emmert,[3] Luschka,[4] Voltolini,[5] Betts,[6] Cohen,[7] and Ronaldson.[8] In Emmert's patient, a boy aged seven, there was complete bony obstruction of both choanæ. Luschka's case occurred in a female child, and the openings were also closed by bone. Thin osseous laminæ extended from the horizontal plate of the palate-bone to the inferior surface of the sphenoid, to which they were united by a dentated suture. In Voltolini's case only the right choana was closed, the atresia being due to "congenital adhesions." Betts found both posterior nares closed by bony partitions in a fœtus seven months old. In Cohen's case the nature of the occlusion is not stated, but it was probably membranous. The example related by Ronaldson occurred in a female child, born at full time and presenting no other malformation, who died very soon after birth, from inability to breathe through the nostrils. The posterior nares were found to be completely occluded by a thick membrane of such firm texture that a probe could hardly be forced through it.

Harrison Allen[9] has lately called attention to an occasional irregularity in the relative size of the nasal fossæ, caused not by deviation of the septum, but in congenital narrowness of one chamber as compared with the other.

---

[1] "Philadelphia Medical News." Jan. 7, 1882.

[2] "Obs. Rarior. Medico-Phys." cent. iii. obs. 43.

[3] "Lehrb. d. Chirurgie." Stuttgart, 1853, Bd. ii. p. 355.

[4] "Schlundkopf der Menschen." 1868, p. 27.

[5] "Die Anwendung d. Galvanocaustik." Wien, 1870, 2nd ed. pp. 240-262.

[6] "New York Med. Journ." July, 1877, p. 97.

[7] "Diseases of the Throat and Nasal Passages." New York, 1879, 2nd ed. p. 385. To Cohen I am indebted for most of the references relating to this malformation.

[8] "Edin. Med. Journ." 1880-81, p. 1035 (May, 1881).

[9] "Philadelphia Medical News." May 26, 1883, pp. 605, 606.

Etiology.—The causes of such anomalous formations are probably the same as those which determine imperfect or abnormal development of other organs. The principal theories on this obscure subject have already been discussed in a previous article (see "Malformations of the Gullet," p. 220, et seq.), and need not be further referred to in this place. With regard to the unequal capacity of the nasal chambers, Allen states that he has observed it chiefly in idiots, and he suggests a possible cause for it in the irregular depth of the depressions in the base of the skull, owing to unequal development in different parts of the brain. I may say, however, that in none of the skulls in the Museum of the College of Surgeons was I able to detect any inequality in the size of the nasal fossæ not dependent on the position of the septum.

Symptoms.—In the cases of deficiency of a portion of the nose mentioned in the above short historical retrospect, no symptom was noticed beyond the disfigurement arising from the malformation. Where there is atresia of the posterior nares, the child's breathing is difficult, and the serious troubles attending obstruction ensue (see p. 293).

Prognosis.—None of the deformities described can be said to threaten life except congenital closure of the posterior nares, and that only in infancy.

Treatment.—Various plastic operations may be undertaken for the correction of these deformities. Maisonneuve, who claims that his case is the first instance on record of rhinoplasty for congenital malformation, has given such an incomplete description of the procedure which he adopted that it is useless to reproduce it; and I can find no statement of the ultimate result of the procedure, either as to the appearance of the organ, or as to its functional utility.

In the case of fissure exposing one nasal fossa up to the root of the nose, Thomas made an incision along the inner edge of the cleft at the junction of the skin with the mucous membrane. He then dissected up the skin, beginning at the narrow strip between the eyelids, which, moreover, he detached by a cross-cut from its union with the upper eyelid. The outer edge of the fissure was then pared, and an incision was carried vertically up the brow from the apex of the fissure. From the upper end of this cut another was carried horizontally towards the other side for about one centimetre, the object being to loosen the integuments on the brow. The ala was next separated from the inferior turbinated bone, to which it was adherent. The integuments of the nose having been dissected up towards the middle line, the parts were made sufficiently movable to enable the operator to bring the ala over into contact with the outer edge of the fissure without using undue violence. The surfaces thus brought into apposition were fixed together by a pin passed through the upper lip and the ala, whilst a suture held the cheek and the inner edge of the fissure in position. The narrow strip of skin between the eyelids, which had been separated from the upper eyelid, was then drawn up with forceps, and inserted between the edges of the vertical incision previously described, being fastened to its new connections by sutures on each side. Finally, the upper angle of the original fissure was closed by a suture passed through its borders just under the lower eyelid. The sutures were removed in four days, when it was found that the ala was firmly united to the outer edge of the nostril, but there was no union at the upper part, a circumstance which Thomas attributed to the somewhat rough usage which the small transplanted flap had received in the course of the dissection necessary to loosen it. In a fortnight the lower part of the nose was almost normal in appearance, but the lower eyelid was still too widely apart from its fellow at the inner canthus, and a fissure from two to three millimetres in width remained between the inner angle of the right eye and the nose. The patient was then unfortunately lost sight of, and nothing seems to be known as to the ultimate result of the case; but, as Thomas remarks, a decided improvement in appearance had so far been achieved, and a subsequent operation for the purpose of remedying the remaining defects would have been much less difficult and severe.

In cases of congenital occlusion of the posterior nares, treatment is imperatively called for, and no time should be lost in carrying it out. A passage must be forced through the obstructing membrane with a strong probe, as in Ronaldson's case, or with the galvanic cautery, as was done by Voltolini, and the opening should be gradually dilated and kept open by the passage of bougies. Tracheotomy is advised by Ronaldson, but this measure would only be justifiable as a last resource.

Congenital deficiency of the olfactory bulbs has already been described under the head of Anosmia (p. 469).

SYNECHLÆ OF THE NASAL FOSSÆ.

Under this term Zuckerkandl[1] has described certain anomalous conditions which may be briefly referred to here. As the name implies, these consist of connecting bands of tissue between particular portions of the interior of the nose which are normally separate. The junction is sometimes made merely by continuity of the investing membrane, and sometimes by true bony union. Four chief varieties of "synechia" appear to occur: (1) membranous bridges spanning the interval between two opposite surfaces—*e.g.*, between the middle turbinated body and the septum: (2) broad membranous junctions between the mucous covering of one of the turbinated bodies and that of the outer wall of the nasal fossa, or between the corresponding angles of neighbouring turbinated bodies; (3) *osseous* bridges connecting one of the turbinated bones with the septum; (4) wide bony union between the edge of the lower turbinated bone and the floor of the nose. It must be understood that all these varieties or any number of them may coexist, and that any one of them may be found in several places. In one case Zuckerkandl found synechiæ between the lower turbinated body and the floor of the nose, between the middle turbinated body and the septum, and again between the same body and the outer wall. In 2,152 skulls examined in the Museum of the College of Surgeons I met with but four instances of bony synechia. In one, the lower turbinated bone was greatly enlarged and adhered to the septum. In a second, in which the septum was deviated to the left, two thick osseous bands, not connected together, ran across from the convexity of the deflected part to join the lower turbinated bone and the portion of the outer wall above it. In a third case, in which there was no septal deviation, there were two bony plates bridging over the space between the left side of the septum and the corresponding outer wall; one was narrow and ran horizontally across from the middle of the septum to the upper part of the lower turbinated bone, whilst the other crossed from the lower edge of the middle turbinated bone to join the septum by an attachment one-third of an inch in width, and sloping slightly upwards from behind forwards along the septum. In the fourth instance the edge of the vomer projected somewhat into the right nasal fossa and from the lower edge of the ridge thus formed an osteo-cartilaginous plate extended horizontally across to the under edge of the lower turbinated bone; this plate ran backwards in the nasal fossa for about an inch, and converted the inferior meatus into a covered way.

---

[1] "Anatomie der Nasenhohle." Wein, 1882, p. 95, et seq.

I have also recently seen a patient in whose case a firm membranous band, covered with mucous membrane, passed across the cavity of the right nasal fossa from the lower turbinated bone to the septum.

Synechiæ are occasionally symmetrical, being present in both nasal fossæ in corresponding situations. It is probable that the condition is nearly always congenital, though it is, of course, possible that it may in certain cases be due to morbid outgrowths followed by ulceration and subsequent adhesion of adjacent parts. This latter view is, perhaps, somewhat confirmed by the fact that synechiæ have been found associated with perforation of the septum.

The condition is in most cases little more than a pathological curiosity. In the example referred to above, which came under my own notice, the patient experienced great difficulty in blowing his nose on the affected side. Should treatment seem desirable, any abnormal piece of bone may be removed by dividing both its attachments with my nasal bone-forceps (Fig. 55, p. 268); or, in the membranous cases, a cure may be effected by means of the galvano-caustic loop. Even osseous bands, when slender, may be got rid of by this method; a case having been reported by Brandeis[1] in which a transverse bony synechia, that caused obstruction of the nasal canal, was removed with the electric cautery.

---

[1] "New York Med. Record." Nov. 12, 1881.

SECTION VI.—DISEASES OF THE NASO-PHARYNX

THE anatomy of the naso-pharynx has already been given in the first volume of this work, whilst the instruments required for the examination and treatment of this part have been described under "Nasal Instruments." It only remains, therefore, to consider the few but very important diseases which occur in the post-nasal region.

CHRONIC[1] CATARRH OF THE NASO-PHARYNX.

(SYNONYMS: POST-NASAL CATARRH. RETRO-NASAL CATARRH. FOLLICULAR DISEASE OF THE NASO-PHARYNGEAL SPACE. AMERICAN CATARRH.[2])

Latin Eq.—Catarrhus longus pharyngis nasalis.
French Eq.—Catarrhe chronique du pharynx nasal.
German Eq.—Chronischer Catarrh des Nasenrachenraumes.
Italian Eq.—Catarro cronico della faringe nasale.

DEFINITION.—*Chronic inflammation of the lining membrane of the naso-pharynx, giving rise to a more or less viscid secretion, the adhesion of which to the part causes a most disagreeable sensation, and induces the patient to make frequent efforts to get rid of it by "hawking" and "clearing the throat."*

History.—The disease was first described by J. P. Frank[3] as a form of chronic catarrh the seat of which is the pharynx. Many years later a detailed account of the affection was given by Dobell.[4] The complaint has been familiar to all those who study throat-diseases from the time of the invention of the laryngoscope; and since I commenced teaching at the Throat Hospital, in 1863, I have constantly called the attention of students to the various features of this important malady. In 1874 Wendt[1] described both the moist and the dry forms of the affection in considerable detail. Lennox Browne[2] in 1878 gave a description of the disease in connection with nasal catarrh and ozæna. Two years later, Beverley Robinson[3], of New York, published a work on catarrh, in which, under the title of "Follicular Disease of the Naso-pharyngeal Space," he gave a very complete account of the complaint. Since then the disorder has been incidentally referred to by Woakes,[4] Rumbold,[5] Bosworth,[6] and by every writer on nasal catarrh. The latest contributor to the literature of the subject is Bresgen,[7] who has recently brought together the views of nearly all preceding writers on this matter.

---

[1] As acute catarrh of the naso-pharynx either rapidly disappears or passes into the chronic form of the disease, it has not been thought necessary to treat it separately.

[2] The complaint is so extraordinarily prevalent in America as compared with any other country, that it may be regarded with all propriety as a national affection.

[3] "De Curand. Homin. Morbis." Lib. v. pars i. pp. 124, 125. Mannhemii, 1794.

[4] "Winter Cough." London, 1866, 1st ed. appendix, p. 172, et seq. Dr. Dobell states that he had already called the attention of the profession to the subject of "post-nasal catarrh" in a paper read before the Abernethian Society of St. Bartholomew's Hospital in 1854.

---

[1] "Ziemssen's Handbuch." Leipzig, 1874, Bd. vii. erste Hälfte.

[2] "The Throat and its Diseases." London, 1878, p. 153, et seq.

[3] "Practical Treatise on Nasal Catarrh." New York, 1880, p. 117, et seq.

[4] "Deafness, Giddiness, and Noises in the Head." London, 1880, 2nd ed. p. 178, et seq.

[5] "Hygiene and Treatment of Catarrh." St. Louis, 1881, part ii. p. 237, et seq.

[6] "Manual of Diseases of the Throat and Nose." New York, 1881, p. 179, et seq.

[7] "Der chronische Nasen- und Rachen-Katarrh." Wien und Leipzig, 1883, p. 41, et seq.

Etiology.—The causes of catarrh in general have been frequently discussed in this work, but for my views on the subject, I would refer especially to the remarks made in connection with acute catarrh of the larynx (Vol. i. p. 265). The affection is exceedingly common in America; indeed so much is this the case that the term "catarrh," as commonly used in America, means post-nasal catarrh—*i.e.*, catarrh of the naso-pharynx. It is possible that a review of the conditions under which post-nasal catarrh exists in America may throw some light on the etiology of the complaint. Unfortunately, however, up to the present, American physicians, though assiduously studying the therapeutics of the disease, have given little attention to its causes. Indeed, the only practitioner who appears to have seriously investigated this subject is Beverley Robinson,[1] who in a thoughtful and suggestive work, remarks:—

"In New York, Boston, and Philadelphia, in many of our western cities, on the sea shore, and in the interior, in fact, over widely extended and very different sections of our country, post-nasal catarrh prevails to an extent which originates much inquiry, and occasions more than passing anxiety to those who have observed its course. Vast numbers of people are already affected with it. Men, women, and children are alike its prey. All ages and professions are subjected to its symptoms and complications. Moderate differences or changes of climate only partially affect its growth; for while in individual instances its onward and rapidly progressive march appears to be somewhat delayed, if not completely arrested, by breathing a high, equable, and dry atmosphere, or by the respiration of air impregnated with balsamic odours, other and numerous examples there are when once the catarrhal affection has become firmly seated, but little influenced for the better by the most rational hygiene and an ambient medium seemingly the most perfectly adapted to their individual needs. Usually speaking, however, a cold damp atmosphere, subject to sudden and great changes of temperature, is supposed to be a general and efficient, if not exclusive, cause of the production and extension of post-nasal catarrh. No doubt this accepted belief has some basis in fact; and yet the more closely I have been able to investigate the subject in its multiple aspects, the more thoroughly am I persuaded that the received opinion is in part erroneous. The development of the malady is not much affected by habit or occupations, and strong and weak organizations are similarly attacked. No constitution is entirely exempt, but certain persons are more disposed to contract it than others."

---

[1] "Nasal Catarrh." New York, 1880. See the article on "Follicular Disease of the Naso-pharyngeal Space (Post-nasal Catarrh)."

Though I would not for a moment place my experience of American catarrh on a level with that of any of the eminent specialists who have given attention to the subject in the United States, I may remark that in a recent tour through that country I had a very favourable opportunity of studying the complaint. For I not only saw examples of the disease over a very wide tract of country, but also observed the atmospheric conditions under which these cases occurred, enjoying, moreover, the great advantage, in many localities, of discussing the subject and hearing the views of able physicians who had been studying the disorder on the spot for many years. I was greatly astonished at the extremely wide diffusion of the affection. I met with it all over the Eastern States, it was very common in Chicago and St. Louis, which may now be called the central cities of America, I found it prevalent in Nebraska and to a slighter extent in Utah, and again I encountered it on the Pacific coast, finding it of frequent occurrence in San Francisco. I had not the opportunity of seeing any patients in Nevada, as I merely travelled through that State without stopping; but in London I have treated many American travellers for post-nasal catarrh who had acquired the disease on the alkaline plains of the Silver State. I also saw a good many patients suffering from catarrh of the naso-pharynx in Colorado. In Southern California and Arizona I scarcely met with any cases, and in Canada the affection, though much more common than in Europe, did not seem to be so universal as in the States. American catarrh, it would seem, principally prevails between latitudes 44 and 38.

My travels in America were made in the latter end of August and in September and October—that is, during the most favourable season of the year; and I have little doubt that had I been there in the winter I should have seen a great deal more of this wide-spread ailment. In many of the regions referred to there are local conditions which tend to irritate the mucous membrane. Thus, all along the eastern seaboard the atmosphere during the winter months is cold and moist, whilst in the summer it is excessively hot. In San Francisco fogs prevail in the summer in the early part of the day, whilst in the afternoon a cutting wind blows continuously. In Colorado, on the other hand, the climate is so extraordinarily dry that only those who have been there can thoroughly appreciate it. The inhabited portion of the country consists of extensive plains situated at an elevation of 5,000 or 6,000 feet above the level of the sea. The dryness of the climate may be gathered from the fact that not a drop of rain falls during nine months of the year, the result being that no trees can flourish, the scrub oak being almost the sole representative[1] of our forest trees, and this being only found in the narrow valleys or cañons, as they are called. Indeed, so dry is the soil that not unfrequently all the prairie grass perishes. The atmospheric conditions, though admirably suited for some forms of consumption, are nevertheless extremely irritating to the mucous membrane of many persons. The white alkaline dust which covers hundreds of miles in Nevada is also met with here and there in Colorado. In the winter and spring the winds are often rather strong, and it will easily be imagined that at such times the abundant dust of this extraordinarily dry country is very irritating.

---

[1] The cotton tree, though indigenous in certain parts of South America, appears to be an exotic in Colorado, and I only saw it as an ornamental tree in the streets and gardens of some of the cities.

The soil of the American continent varies so widely in different parts that it is impossible to suppose that it is concerned in the etiology of the affection. Again it will be readily understood that the meteorological conditions over this vast area are so various that they cannot be regarded as a cause acting with anything like uniformity. The general character of the atmosphere of the American continent, as compared with that of Great Britain, and also with most parts of Europe, is that it is drier, that the changes of temperature are more sudden, and the extremes of heat and cold much greater. There is nothing, however, in these conditions to account for the localization of the complaint in the naso-pharynx, and it would seem that post-nasal catarrh is not due to what may be strictly called climatic influence, but to something which is accidentally introduced into the atmosphere of widely differing localities; in other words, that there must be irritant particles floating in the air over very wide areas. This is actually the case, for *dust* is to be found everywhere in America.

The universal prevalence of catarrh is indeed fully explained by the abundance of dust, both in the country and the cities. Owing to the immense size of the country, and its sparse rural population, the country roads have not, as a rule, been properly made, and except in some of the older States are merely the original prairie tracks. In the cities, notwithstanding the magnificence of the public buildings, the splendour of many of the private houses, and the beauty of the parks, the pavement is generally worse than it is in the most neglected cities of Europe, such, indeed, as are only to be found in Spain or Turkey. It must be recollected also that whilst in the decayed towns of the Old World there is very little movement, in the American cities there is a ceaseless activity and an abundance of traffic. Hence, the dust is set in motion in the one case, but not in the other. The character of the dust, of course, varies greatly according to locality. In some parts it is a fine sand, in others an alkaline powder, whilst in the cities it is made up of every conceivable abomination, among which, however, decomposing animal and vegetable matters are not the least irritating elements. An idea may, perhaps, be formed of the state of the atmosphere from a consideration of the fact that in many cities the functions of the scavenger are quite unknown.

That a dusty atmosphere is the real cause of post-nasal catarrh is rendered probable by a consideration of the anatomical relations of the naso-pharynx. For owing to its being a cul-de-sac out of the direct line of the respiratory tract, particles of foreign matter which become accidentally lodged in its upper part are got rid of with difficulty—most likely by an increased secretion, which, as in the case of the conjunctiva, washes away any gritty substance which may temporarily alight on the membrane. In the larynx, irritating dust is dislodged by coughing, which may be either reflex or voluntary; and again in the case of the nasal passages, the minute particles of matter which constitute dust are expelled, if they happen to be obnoxious, either by sneezing or blowing the nose. But reflex acts, such as coughing and sneezing, have no effect on the upper part of the naso-pharynx, and it is only by a voluntary effort, known as "hawking," that this cavity can be partially cleared. It is probable also that owing to the sensibility of the naso-pharyngeal mucous membrane being less acute than that of either the nose or the larynx, minute foreign bodies accidentally lodged in the vault of the pharynx do not cause an amount of discomfort at all corresponding to that in the adjacent parts; hence particles of matter are more likely to remain *in situ* for a long time in the post-nasal region, than in either of the other parts, and are, of course, very apt to set up disease. In this country the complaint is most common in persons whose pharynx is large in the antero-posterior direction, a form of throat which facilitates the entrance, without favouring the expulsion, of foreign particles. It will be readily understood that any morbid state of the posterior nares may lead to chronic inflammation, and thereby establish a catarrhal condition of the naso-pharyngeal region. In young subjects, adenoid growths are often a source of irritation. In such cases, however, the discharge which is set up does not tend to become adherent, as in true post-nasal catarrh, but flows away with comparatively little inconvenience. In fact, the catarrhal affection is altogether different from the idiopathic post-nasal catarrh which is met with in its typical form in America.

Whilst, however, it is highly probable that dust is the most frequent cause of post-nasal catarrh, no doubt it is not the only one. Many circumstances favour its development. Thus I have noticed that in many cases the sufferers have been persons who partake largely of pungent condiments, and the habit (almost universal in America) of taking sauces and pickles with every dish may be concerned in the production of the disease. The national dyspepsia is also probably a most powerful factor, and a well-known American statesman tells me that he has known many cases cured by "abstemiousness and farinaceous diet." Some physicians have attributed the complaint to the custom of over-heating houses by hot air and steam, as is commonly done in America. In the winter the temperature is never allowed to fall below 70° Fahr., and is generally much higher. The sudden passage from this temperature to that of the street is not unlikely often to set up catarrh; but as the same mode of heating is used in Russia without, as far as I am aware, giving rise to any post-nasal affection, its influence cannot be very great. The importance of heredity in the etiology of catarrh has been recently strongly insisted on by Bresgen,[1] and although no extensive series of exact observations has yet been made on this point, there is every probability that a disposition to catarrh may be inherited. I have seen so many instances, however, in which foreigners making a short stay in America have become affected with post-nasal catarrh, that I think there can be little doubt that atmospheric conditions—and those, let me add, of an accidental and controllable character—are much more powerful than heredity.

It is supposed by some that catarrh is contagious, but though the popular belief is strong on this point, there is very little scientific evidence in its favour. On this subject Beverley Robinson[2] asks—"How is it that a disease which is so prevalent in many sections of our country is certainly less known and familiar in England and on the Continent? Certainly, if the extensive propagation of this affection is merely a direct consequence of intimate contact there would be just the same probabilities of the increase there as here." It is somewhat remarkable, that at the present time, when germs are supposed to give rise to so many diseases, post-nasal catarrh has not been referred to this source, to which it may be remarked coryza has been attributed. Failing to discover any atmospheric cause for American catarrh, Beverley Robinson[3] suggests that "a special constitutional tendency exists in the individual." He observes that "post-nasal catarrh must not be confounded, as it almost universally is, with ordinary rhinitis. It is not simply an acute or chronic inflammatory condition of the pituitary membrane, nor should it, therefore, be treated in the same way; for if it is, signal failure almost will follow our every effort. An acute or chronic coryza is, without doubt, a predisposing and at times a proximate and *partially* efficient cause of its becoming manifest. But in order to effect the grafting of post-nasal catarrh, a certain diathetic condition is essential." He proposes to call this diathesis "catarrhal," and appears to think that there is some relation between it and the herpetic disposition. In putting forward an hypothesis which has no facts to support it, Robinson appears to have adopted the fallacies of the French School (see Vol. i. p. 29, note 6). I entirely agree with him, however, that catarrh of the naso-pharynx very frequently commences in coryza; and, notwithstanding his views as to the "catarrhal diathesis," it would appear that he does not attempt to circumscribe the diathesis too closely, for in referring to this complaint he observes that, "while follicular disease is at times due to the catarrhal diathesis pure and simple, so it may be and frequently is attached to the gouty, herpetic, syphilitic, scrofulous, and tubercular. The malarial influence may likewise be evident. . . . ."

---

[1] Op. cit. p. 41. [2] Op. cit. [3] Op. cit. p. 145.

Lennox Browne[1] considers that the diathesis of patients suffering from catarrh of the naso-pharynx is "generally of a scrofulous character." Seeing, however, that the complaint is so very common in America, that it affects people of every temperament and constitution, and that it is readily acquired by visitors to the United States, it more probably depends on atmospheric conditions than on any diathesis.

Symptoms.—In slight cases the patient is troubled with a disagreeable sensation, as of something sticking in the upper part of the throat, which has to be frequently cleared away from the back of the nose. Distinctness in articulation is often interfered with. There is, in fact, a want of resonance or definition, more especially in the pronunciation of gutturals. This may be so slight as to be inappreciable by any one but the patient himself, who, if he is an educated person, and one who has to employ his voice in public, is almost sure to complain of it. When the disease is more severe the mucus is often extremely tenacious, and the patient has then to make the most violent and frequent efforts to "hawk" it from the naso-pharynx, a proceeding which is as disagreeable to the patient as it is disgusting to those about him. The effort to get rid of the mucus is often accompanied by nausea, and in some cases by actual sickness. A very unpleasant sensation is constantly felt at the back of the throat, and in severe cases the patient experiences a dull aching feeling in the upper part of the throat, and occasionally weight or pain is complained of in the occipital region. On looking into the naso-pharynx moist yellowish white masses of mucus are seen *adhering* to the posterior wall and sides of the cavity. Post-nasal catarrh is often the cause of throat-deafness, and in some cases it gives rise to slight hæmorrhage, which occasionally stains the patient's pillow, or occurs when he wakes in the morning; the source of the blood is apt to puzzle physicians who do not examine the naso-pharynx. The mucous membrane, after it has been cleansed with a spray or syringe, generally looks very red, but if a short time, say fifteen or twenty minutes, is allowed to elapse, much of the congestion, which is evidently due to the cleansing process, disappears. Raised red granulations can then be seen on the posterior wall and sides of the naso-pharynx. Sometimes they are small, oval or round in form, but, not unfrequently, those situated on the sides of the naso-pharynx are long and narrow, often from five millimetres to a centimetre and a half in length, and from three to five millimetres in width, but only slightly raised above the surface. In severe cases small erosions may be seen here and there, and occasionally ecchymotic spots. In young subjects adenoid growths are sometimes present, or there may be simple enlargement of Luschka's tonsil. Congestion and swelling of the Eustachian orifices are often apparent, and now and then one or both of the openings are completely blocked up by adherent mucus. The oro-pharynx will generally be found more or less congested, and presenting in places a granular appearance. Varicose veins are also often visible on the posterior wall, whilst the pillars of the fauces are infiltrated or thickened.

---

[1] "The Throat and its Diseases." London, 1878, p. 463.

Pathology.—The morbid changes which take place in the naso-pharyngeal region have not hitherto been studied on the dead subject, but no doubt they are identical with those which usually occur in catarrhal inflammations. As far as can be seen during life, the morbid process seems to be the same as has been described under the head of "Hypertrophic Granular Pharyngitis" (Vol. i. pp. 32, 33).

Diagnosis.—Post-nasal catarrh is occasionally altogether overlooked by medical practitioners who are unacquainted with the affection, but those who have studied rhinoscopy are unlikely to make any mistake. When the patient is a young subject, catarrh of the naso-pharynx will sometimes be found to be due to adenoid growths; but, as already pointed out, the secretion differs altogether from that of true post-nasal catarrh. These formations, moreover, can generally be easily felt with the finger, and seen with the mirror. The possible presence of polypi should be borne in mind. Syphilis, likewise, both in its secondary and tertiary manifestations, may cause symptoms analogous to catarrh. If the naso-pharynx is well cleansed, however, condylomata or ulcers, if present, can usually be seen. In cases of tertiary disease, the administration of iodide of potassium will soon set the question of diagnosis at rest.

Prognosis.—The disease is not dangerous, but it is often a lasting inconvenience, and if it has existed for several years before it comes under observation, it is seldom cured; in recent cases, however, the complaint may occasionally be completely eradicated, and old-standing cases can, as a rule, be kept under control by judicious treatment.

Treatment.—This may be constitutional or local, or may combine both systems. Those who believe in the diathetic origin of the complaint naturally recommend internal remedies. Beverley Robinson[1] has found benefit from sulphur, cubebs, and ammoniacum; the sulphur may be given in the form of Harrogate waters; cubebs may be administered in a tincture with an equal part of tincture of orange to cover the taste; and ammoniacum may be prescribed in very small doses—one, two, or three grains—combined with ipecacuanha. Other writers have recommended cod-liver oil and phosphate of iron. Of course, in any case in which there is marked debility, tonics are likely to do good. In my experience, however, little benefit is, as a rule, derived from general remedies, whilst local treatment affords much relief. The first thing to do is to completely remove all the mucus from the naso-pharynx, or, in other words, to cleanse the parts thoroughly. If this can be accomplished by the use of sprays, it is the most advantageous method for the patient; but both anterior and posterior sprays are likely to be required. One of the best solutions is that introduced by Dobell (see Appendix), but if the carbolic acid is objectionable or irritating, the "compound alkaline wash" (see Appendix) may be substituted. If the secretion cannot be removed by spraying, the post-nasal syringe must be used; and if this again does not succeed, a medium-sized laryngeal brush should be employed. After the mucus has been got rid of, I have found most benefit from astringent insufflations. Of these, pale catechu, persulphate of iron (one part to three of starch), and eucalyptus are the most efficacious; but the eucalyptus (one part of the gum to two of starch) is the preparation that I most rely on. The patient can often cleanse the naso-pharynx with a hand-wash or nasal douche, and may be taught to insufflate the powder himself.

---

[1] Op. cit. p. 146.

In those fortunate cases in which great benefit has resulted from these measures, a complete cure may sometimes be effected by winding up the treatment with a course of Mont-Dore or Bourboule waters.

The diet should always be non-irritating, strong drinks and pungent food being carefully avoided. Lennox Browne[1] thinks that "it is advisable to restrict the amount of fluid food to a minimum." I have no experience of this method of treatment, and do not see how it could have much effect on a complaint of so chronic a type as the one under consideration. In all cases the use of tobacco should be given up, particularly the smoking through the nose which is the practice of those who indulge in cigarettes.

Persons who show a predisposition to post-nasal catarrh should take special precautions against it. Travellers in dusty places—especially if the dust is of an alkaline character—should wear Gottstein's tampons (Fig. 73, p. 282) in the nose, and should also make use of respirators or keep the mouth constantly shut. Irksome as these measures may be, they are less troublesome than the annoying complaint against which they are meant to guard.

DRY CATARRH OF THE NASO-PHARYNX.

This disease closely resembles dry catarrh of the nose: and to the article on that subject (p. 324, et seq.) the reader must be referred for a detailed description of the etiology and pathology of the disease. Like dry catarrh of the nose, it very frequently leads to ozæna. It is probably in most cases a sequel of moist catarrh, but sometimes it appears to be dry from the commencement. As in the case of moist catarrh of the naso-pharynx, it is most common in persons who have a somewhat roomy pharynx. On looking into the throat, the buccal pharynx may be simply dry and shiny, but on examining the naso-pharynx flakes of dried mucus of a dark-brown or black colour are often seen. It is characteristic, however, of this form of catarrh for the objective symptoms to be very slight. When the complaint has reached the stage of ozæna a disagreeable smell is noticed in the breath, and every few days a round or oval mass, from two to three centimetres in length, and from one to two centimetres in width, is expelled. These lumps of inspissated secretion are generally of a dirty-white or green colour, but they may be brown, or even black; they are of somewhat dense consistence, moist externally, but dry and very compact towards the centre. Sometimes on section they show a sort of concentric arrangement, as if they were made of successive deposits. Their probable mode of detachment has already been explained in dealing with the nasal form of the complaint. Occasionally, by digital examination, one of these lumps can be felt in the naso-pharynx, occupying a corner of the vault on one side of the median raphe, or even extending right across it. The disease is frequently associated with a similar condition of the nose, but in some cases it is limited to the post-nasal region. On cleansing the mucous membrane it generally presents, after a short interval of time, a pale and atrophied appearance.

---

[1] Op. cit. p. 164.

The remarks which have been made on the *diagnosis* and *pathology* of dry catarrh of the nose (see p. 332, et seq.) are applicable to the naso-pharyngeal region. Dry catarrh of the naso-pharynx is extremely obstinate, and the *prognosis*, as regards cure, is very unfavourable.

The *treatment* must be carried out in the way recommended for moist catarrh, but disinfectants are even more necessary. Dobell's solution, which has been already mentioned (p. 491), is one of the best sprays, but if continued for any length of time the proportion of carbolic acid should be reduced by one-half. The Nebula Alkalina of the Throat Hospital Pharmacopœia will also be found very serviceable.

ADENOID VEGETATIONS OF THE NASO-PHARYNX.

Latin Eq.—Tumores glandulosi pharyngis nasalis.

French Eq.—Tumeurs adénoïdes du pharynx nasal.

German Eq.—Adenoide Vegetationen des Nasenrachenraumes.

Italian Eq.—Tumori adenoidi della faringe nasale.

Definition.—*Minute glandular vegetations growing from the vault and sides of the naso-pharynx, causing the voice to be dull and nasal in tone, the respiration to be buccal, frequently inducing deafness by setting up inflammation of the middle ear, and in the case of children often giving rise to the constitutional phenomena which follow prolonged nasal obstruction.*

History.—In the year 1860 Czermak[1] observed two small tumours at the upper part of the naso-pharynx on the left side, close to the opening of the Eustachian tube, one portion of which somewhat resembled a "cock's comb." These were probably the first adenoid growths ever seen. Five years later Voltolini[2] reported the case of a man, aged forty-one, who had come under his care two years previously, on account of extreme deafness. Under various treatment the patient's hearing had greatly improved: but in the summer of 1865 Voltolini, on making a rhinoscopic examination, perceived "stalactite-like growths projecting into the free cavity of the naso-pharynx." These tumours having been destroyed in three sittings, by means of electric cautery, further improvement took place in the hearing. In the same year Löwenberg[3] published three cases in which he had found vegetations in the naso-pharyngeal region of patients suffering from deafness, which, he pointed out, were probably identical in their nature with the hypertrophied mucous glands characterizing granular pharyngitis.

---

[1] "Der Kehlkopfspiegel und seine Verwerthung für Physiologie und Medizin." Leipzig, 1860. Soon after, Semeleder reported some cases of growths in the vault of the pharynx, but they seem to have been rather of the nature of fibrous polypi than adenoid vegetations ("Die Rhinoscopie," &c. Leipzig, 1862. p. 46, et seq.).

[2] "Allgem. Wien. med. Zeitung." No. 33, 1865. In the previous year Andrew Clark published a short article on "Nasopalatine Gland Disease" ("Lond. Hosp. Reports," vol. i. p. 211), which, I have no doubt, was the same disease as that subsequently described by Meyer under the name of "Adenoid Vegetations." Clark remarked that this disorder can be "demonstrated only by rhinoscopic examination," but an otherwise accurate description of adenoid vegetations is marred by the statement that "fetid cheesy masses" are sometimes contained in the cavities of the glands. It is probable, therefore, that Clark's cases were complicated by the "exudative form of follicular pharyngitis." (See Vol. i. p. 33 of this work.)

[3] "Archiv fur Ohrenheilkunde," 1865, Bd. ii. p. 116, et seq. These *Archives* are published in parts, vol. ii. covering the years 1865, 1866, and 1867, but Lowenberg's article appeared in 1865. As, however, the whole volume bears the date 1867, it has been erroneously supposed that Lowenberg's article was not issued till that year. In his recent work Lowenberg calls attention to these facts, which, on investigation, I have found admit of no dispute.

In 1868 Wilhelm Meyer,[1] of Copenhagen, for the first time gave a complete picture of glandular disease in the naso-pharyngeal region, under the name of "Adenoid Vegetations." Whilst fully describing the symptoms and progress of the affection, he detailed the microscopic appearance of the growths, and pointed out a mode of surgical treatment which he had found highly effectual. Meyer had already at that time examined 2,000 children in the National Schools of Copenhagen, and had met with the affection in 1 per cent of the cases examined. Indeed, he may be justly considered the discoverer of adenoid vegetations in the vault of the pharynx; for although not the first to observe these growths, he certainly first realized their importance, and fully described them. Subsequent workers have done little but confirm Meyer's observations. A short paper on adenoid tumours was presented to the International Medical Congress at Brussels, in 1875, by Guye,[2] of Amsterdam; and in the following year the subject was still further elucidated by Carl Michel,[3] of Cologne. A short note was published in 1879 by Victor Lange,[4] of Copenhagen, in which he suggested a modification of Meyer's method of operation; and in the same year an excellent account of the disease was given by Solis Cohen[5] in the second edition of his valuable work. Löwenberg,[6] moreover, returned to the subject in 1879, when he published a very complete monograph on the disease. Special mention may also be made of a paper by Tauber,[7] of Cincinnati, who found ·6 per cent. of adenoid growths amongst his cases of nasal and pharyngeal disease. Adenoid vegetations were made the subject of public discussion at the International Medical Congress, held in London, in 1881, when most of the above-mentioned writers gave the result of their increased experience; and Capart, of Brussels, who has been very successful in his treatment of these growths, exhibited several hundred specimens —or, to speak more correctly, several large bottles filled with vegetations. On the same occasion, Woakes[8] read a paper founded on the observation of one hundred cases, and, in opposition to the usual opinion that they are of adenoid structure, maintained that these growths are mainly papillomatous in texture.

Etiology.—The disease is more commonly observed in the young than in adults. The great abundance in the naso-pharynx of children of lymph-follicles, some of them solitary, and others united to form the tonsil of Luschka (Vol. i. pp. 1, 2), explains the frequent occurrence of allied morbid growths in early life. That lymphoid tissue is also easily excited to active growth in young subjects is seen in the case of the tonsils and cervical glands, and it is highly probable that very slight catarrh of the naso-pharynx often leads to the excessive development of the tissue in question. It must not, however, be forgotten that vegetations which in children would cause marked symptoms, might produce but little inconvenience in the larger naso-pharynx of the adult, and hence that they may be easily overlooked in the latter case. Sex has no influence : out of one hundred and two cases observed by Meyer,[1] fifty-two belonged to the male and fifty to the female sex ; whilst Woakes[2] found the complaint almost equally prevalent in the two sexes. In eighty-two cases[3] seen by myself, forty-seven were females and thirty-five males. Between the ages of five and ten there were fifty-one ; between ten and fifteen, twenty-seven ; between fifteen and twenty, two ; and at the ages of twenty-four and twenty-seven, one. Dr. Felix Semon has furnished me with a table of fifty-six cases observed by himself, in fifty-three of which the patients were under twenty years of age. Dr. Semon, however, thought that in all the cases the disease commenced in the first decade of life. Golding Bird[4] has recently reported two cases in which the first symptoms of the complaint showed themselves after the age of forty. The number of observations hitherto collected, however, with reference to age and sex is at present too limited to furnish any trustworthy conclusion : and it may be remarked that for statistics as to age to be of any value etiologically, it would be necessary to ascertain when the growths first commenced.

---

[1] "Hospitals Tidende." Nov. 4 and 11, 1868; also "Trans. Med.-Chir. Soc." London, 1870, vol. liii. p. 191, et seq.

[2] International Med. Congress, Brussels, 1875.

[3] "Krankheiten der Nasenhohle und des Nasenrachenraumes," 1876, p. 77. et seq.

[4] "Note sur les Tumeurs adénoides." Copenhague, Août, 1879.

[5] "Diseases of the Throat and Nose." New York, 1879, 2nd ed. p. 253, et seq.

[6] "Tumeurs adénoides du Pharynx nasal." Paris, 1879.

[7] "Cincinnati Lancet and Clinic," April 24, 1880.

[8] "Trans. Intern. Med. Congress." London, 1881. vol. iii. p. 291, et seq. See also this author's work on Deafness, Giddiness, etc. London, 1880, p. 32.

It is likely that the acute exanthems, and whooping-cough which so frequently gives rise to a catarrhal condition of the lining membrane of the throat, may have some influence in producing adenoid growths.[5] It has been suggested that those who inherit a scrofulous constitution are more liable to the development of the disease than others, but in connection with this point I may remark that my experience is quite in accordance with that of Meyer, for I have noticed that children suffering from adenoid vegetations seldom show any other marked sign of struma, such as enlarged cervical glands, ophthalmia tarsi, or otitis. In some of the cases published by Löwenberg[6] heredity appears to have had a marked influence, but here again the statistics are too limited, and, moreover, attention has been directed to the subject too recently for satisfactory observations to have been collected. In the next generation this point will be more easily determined. A cold moist climate has probably a considerable influence in the production of the disease, which is much more prevalent in the north than in the south of Europe.

---

[1] Loc. cit. p. 208.

[2] Loc. cit.

[3] These were all observed before the end of 1879. Since then I have of course seen a great many additional cases.

[4] "Guy's Hosp. Reports," 1881, 3rd series, vol. xxv. pp. 441-443.

[5] See Vol. i. p. 301.

[6] Op. cit p. 12.

Meyer[1] points out that in three out of four cases of cleft palate which came under his notice, these growths were present, and he attributes this to the direct irritation to which the mucous membrane is subjected from food and cold air. Oakley Coles,[2] who has had an exceptionally large experience in connection with cleft palate, has noticed the extremely frequent association of adenoid vegetations with this deformity. I do not know what the cause of the occurrence of these growths may be in these cases, but I may add that I have scarcely ever met with an example of cleft palate without finding a profusion of adenoid growths in the naso-pharyngeal region.

Symptoms.—In infants the first symptom to attract attention is, as a rule, "hard" breathing or snoring during sleep, sometimes even such attacks of dyspnœa as have been described under the head of "Acute Coryza in Infants" (p. 293). In older children it is the dull voice and deafness which generally claim our notice. It will mostly be found that symptoms of chronic catarrh of the nose and naso-pharynx exist; and on looking into the throat, a yellowish-green secretion may be seen trickling down the back wall of the pharynx. In the morning, the child's pillow is occasionally found stained with dark mucus, and sometimes with a little blood, which has dribbled from the mouth during sleep. In rare cases, indeed, the patient expels a small quantity of pure blood. The constantly open mouth and a certain stupid expression of countenance are, in the absence of enlargement of the tonsils, characteristic symptoms of post-nasal growths. David[3] has recently gone so far as to assert that these formations reveal themselves externally by a modification of the physiognomy, which consists essentially in a deformity of the upper jaw, with projection of the incisor teeth and narrowing of the palatine arch. He holds that the patient being only able to breathe through the mouth in such cases, the palate (still in course of development and comparatively soft) is subjected to constant pressure on its buccal surface, and thereby pushed unduly upwards. This, however, is evidently an erroneous explanation of an irregular mode of development well known to dentists.[1] The deformity of the chest which has been described (Vol. i. pp. 63, 64) as occasionally associated with chronic enlargement of the tonsils, is not unfrequently present when post-nasal vegetations block up the naso-pharynx. Noisy respiration whilst the child is awake, and, as already observed, snoring during sleep, are also common symptoms of the affection. When the child is old enough to talk, it not only speaks "through its nose," as the term is popularly employed, but, in addition to this, the voice is muffled, or as Meyer terms it, "dead." In adults, this is sometimes the only symptom of the complaint, the other troubles having disappeared with the enlargement of the naso-pharynx. In cases of long standing, deafness often results from mechanical closure by the growths of the Eustachian orifice, a condition well exemplified by a case which I recently treated with Sir William Jenner and Dr. Gimson, of Witham (see Fig. 88). The hearing may also become impaired in consequence of the vegetations causing catarrh of the tube or even of the middle ear. (See "Throat-deafness.")

---

[1] Loc. cit. p. 209.

[2] "Proc. Royal Med.-Chir. Soc. of London," Nov. 23, 1869: "Brit. Med. Journ." 1869, vol. ii. p. 619. See also Coles's work: "Deformities of the Mouth." London, 1881, 3rd ed. p. 51, et seq.

[3] "Revue Mensuelle de Laryngologie, &c." 1883, No. 12, pp. 380, 381.

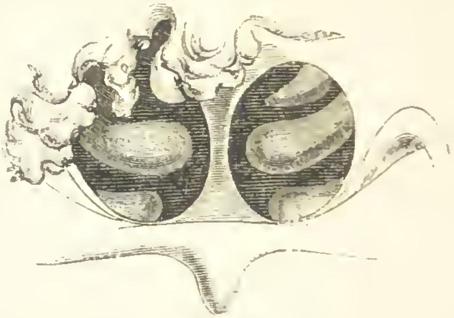

FIG. 88.—VEGETATIONS OVERSHADOWING LEFT EUSTACHIAN APERTURE.

On making a rhinoscopic examination, the growths can often be seen partly covering the posterior nares. They are generally of a pale colour, but are sometimes pink, and even bright red; as a rule, they are rounded in form, and vary in size from a hemp-seed to a currant, but are occasionally much larger, and often occur in clusters. In some cases they hang down from the roof of the pharynx (Fig. 89) like stalactites, and, more rarely still, they are flat, like the granulations often seen on the posterior wall of the pharynx; sometimes a broad pad-like growth will stretch almost across the naso-pharynx. The vegetations are most abundant on the vault and upper part of the posterior wall of the naso-pharynx, but they are not unfrequently grouped round the Eustachian orifices. Occasionally they cover the entire mucous membrane of the posterior nares, but the septum is seldom attacked. Owing to the difficulties which have been already described (see "Rhinoscopy," p. 247, et seq.), it is not always possible, especially in young children, to make a rhinoscopic examination, but by passing the index finger behind the uvula the growths can generally be easily felt, when they are found to be smooth, soft, and yielding

---

[1] See Oakley Coles: Op. cit. p. 86, et seq.

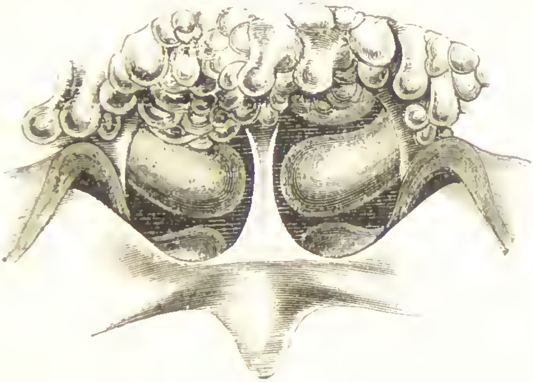

FIG. 89.—ADENOID GROWTHS IN THE VAULT OF THE PHARYNX. (FROM A YOUNG WOMAN.)

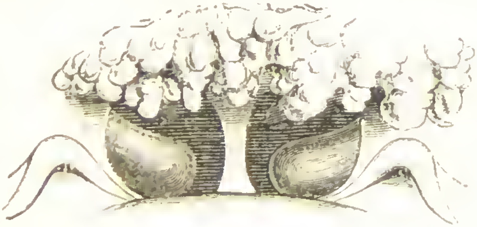

FIG. 90.—ADENOID GROWTHS IN A CHILD.

to the touch, and prone to bleed. When they are abundant, as was first pointed out by Meyer,[1] they give a sensation very much like a bunch of earthworms. Not unfrequently, however, separate vegetations can be felt.

Diagnosis.—The morbid conditions with which adenoid growths may be confounded are: chronic catarrh, general hypertrophy of the mucous membrane about the posterior nares, polypus, and post-pharyngeal abscess. It is very unlikely that the merest tyro would confound fibrous or bony tumours or exostoses from the walls of the naso-pharynx with the complaint now under consideration. The condition of the mucous membrane of the nares can usually be ascertained by anterior rhinoscopy, and hence catarrh and thickening can generally be readily eliminated. In cases, however, where these conditions coexist with adenoid growths, the diagnosis can only be made by direct observation, or digital examination. Those who are inexperienced in rhinoscopy should look for the upper arches of the posterior nares, for if their sharp outline is obscured by any tissue hanging down over them, this is exceedingly likely to be of adenoid nature. This is the plan which Dr. Felix Semon informs me he is in the habit of recommending to his class, and it appears to me to be an exceedingly good one. Polypi are extremely rare before the age of sixteen, and retro-pharyngeal abscess, though often insidious, is accompanied with pain and difficulty in swallowing, and the symptoms come on much more rapidly than those caused by adenoid growths. The abscess, moreover, in most cases comes into view, or, at any rate, can be felt with the finger, and there is usually some tenderness on pressure. Fibrous tumours of the naso-pharynx rarely commence before the age of fifteen, and it is only in their very earliest period that they can be confounded with adenoid growths, for, as a rule, they grow rapidly, and soon cause so much displacement of the surrounding tissues that their nature cannot be mistaken. Osseous tumours are seldom, if ever, met with except in adults, and, when large enough to give rise to obstruction, generally cause pain and hæmorrhage. Digital examination also at once enables the practitioner to recognize their nature.

Notwithstanding the number of diseases with which it is possible that adenoid vegetations might be confounded, yet, taking into consideration the age of the patient and the marked symptoms caused by the growths, there is practically very little likelihood of a mistake occurring.

---

[1] Loc. cit. p. 193.

Pathology.—Microscopic examination of these naso-pharyngeal growths shows that they consist of cylindrical

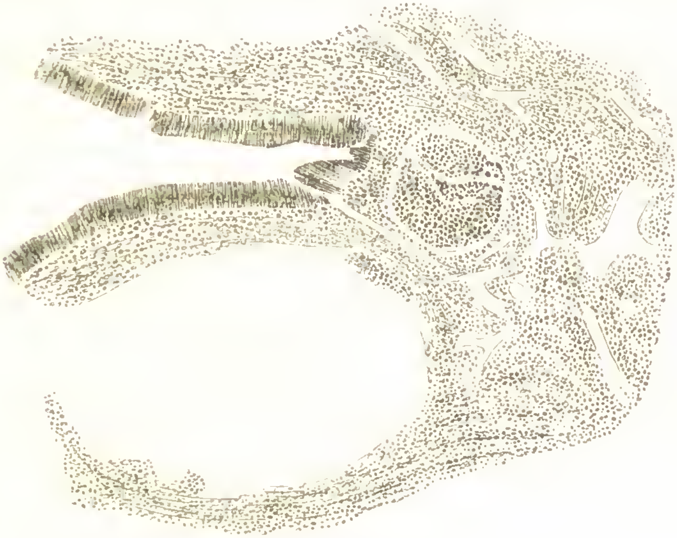

FIG. 91.—SECTION OF ADENOID GROWTH (× 60).

Showing a small portion of the cylindrical epithelium (whether ciliated or not cannot be determined) covering the surface, the vascular nature of the growths, the vast number of cells of which they are composed, and two follicles (similar to those seen in the tonsil), one of which is filled with cells, whilst the other is empty.

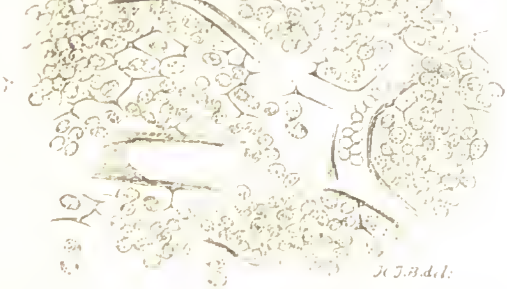

FIG. 92.—PORTION OF THE SAME GROWTH AS FIG. 91, BUT MORE HIGHLY MAGNIFIED (× 210).

(The lymphatic or adenoid character of the tissue is very evident.)

and sometimes ciliated epithelium, with an abundance of the retiform adenoid tissue of His, containing in its meshes quantities of lymph cells. True follicles are also met with and occasionally a conglomerate gland, and the structures are generally highly vascular. The glandular element is, as a rule, more marked in growths taken from the vault of the pharynx, whilst in vegetations removed from the lateral walls, the stroma of His is found in greater abundance. I am indebted to Mr. Butlin, of St. Bartholomew's Hospital, for admirable microscopical drawings (Figs. 91 and 92) of an adenoid growth which I removed by means of the "sliding forceps" from the extreme upper part of the vault side of the pharynx of a boy, aged ten, who suffered from deafness and a thick voice.

Prognosis.—Considering that these growths can produce such grave evils as have been described, they ought not to be regarded too lightly; but, on the other hand, as frequently happens in the case of recently-discovered diseases, there is at present, perhaps, a slight tendency to exaggerate their importance. Although the complaint may justly be looked upon as serious when the vegetations are large enough to interfere with nasal respiration or to cause inflammation in the neighbourhood of the Eustachian tube, it need not, as a rule, give rise to much anxiety. It is, indeed, highly probable that in many cases the growths spontaneously undergo atrophic changes in early adult life, whilst, as already pointed out, the larger size of the naso-pharynx makes their presence less injurious. Before adolescence has been reached, however, permanent deafness, defective articulation, and a lasting deformity of the thorax may have been produced.

Dr. Meyer informs me that in his experience the growths have a tendency to sprout up anew in greater luxuriance than before if the whole mass be not thoroughly cleared away, but I do not think that this observation accords with the experience of others who have given attention to the subject.

Treatment.—This consists in the removal or destruction of the growths. When they originate from the vault removal can best be effected with the cutting forceps of Löwenberg (see Nasal Instruments) or Solis Cohen.[1] Both these physicians appear to have suggested this mode of removal at about the same time. Cohen observes, "I have long used a gouge-cutting forceps, modelled on Mackenzie's similar instrument for cutting off laryngeal growths, with the shank curved to suit the anatomical disposition of the parts over which it must be passed."[1] The shape of Löwenberg's instrument with Woakes's modification of the cutting edges appears to me rather more convenient than that of Cohen, the blades being shorter and forming a rather more obtuse angle with the shaft. In children who are likely to struggle much during the operation, or to resist its being repeated —that is to say, in those between eight and thirteen or fourteen years of age—I generally have chloroform administered. For younger children, however, and for adults I do not employ any anaesthetic. It is seldom that forceps can be used while the mirror is in position, and it will mostly be found sufficient first to make an accurate diagnosis and then immediately to introduce the forceps. Some operators guide the instrument with the index finger of the left hand; but this procedure is seldom necessary except when the patient is under an anaesthetic. For removal of growths from the lateral walls Löwenberg recommends a modification of Volkmann's sharp spoons, suitably curved for introduction into the posterior nares. In operating with this instrument the index finger of the other hand should be used for the purpose of firmly adjusting and securing the growth. For these vegetations, however, my sliding-forceps (Fig. 63, pp. 274, 275) will be found to answer well. Meyer lately recommended a somewhat similar instrument, but he still strongly advocates the use of his "ring-knife" (pp. 275, 276), and employs it almost exclusively. In this country, however, patients greatly dislike the passage of instruments of any size through the nose, and nearly all operators effect removal of the growths through the posterior nares.

---

[1] "Diseases of Throat and Nasal Passages." New York, 1879, 2nd ed. p. 262. The author gives a woodcut of his instrument.

Zaufal[2] has succeeded in removing vegetations from the naso-pharynx by passing through one of his funnels (Fig. 28, p. 242) a steel wire which, by an ingenious contrivance, is pushed out so as to form a loop and catch the growth. Capart[3] has adopted this method of expanding the loop and applied it to electric cautery. The latter physician also often uses a sort of ring-knife or sharp scraper, carried on a metallic finger-shield (see Nasal Instruments, Fig. 65,

---

[1] Op. cit. p. 262.

[2] "Prag. med. Wochenschr." 1878.

[3] "Bull. Acad. Roy. de Méd. de Belg." 1879, 3 sér. xiii. 1151.

p. 276), whilst Guye,[1] of Amsterdam, uses his finger-nail for the same purpose.

In the course of operations on these growths there is often pretty free bleeding, and in some cases a hæmostatic is required. The nasal douche may be employed, cold water being passed through the nares, and powdered tannin or matico leaf may be insufflated behind the uvula. As a matter of fact, however, I have never met with hæmorrhage profuse enough to require the use of any styptic.

If the electric cautery is used, Lincoln's instrument (Fig. 61, p. 273) would, no doubt, be found very convenient.

In order to re-establish respiration through the nose it is most important to teach patients to keep the mouth shut, and, during sleep, a chin-piece, with tapes to tie over the head, as recommended by Löwenberg,[2] may be worn, or a respirator, as suggested by Guye, of Amsterdam.[3] Löwenberg's plan appears to me most suitable for young children, and I have put it in practice once or twice with satisfactory results.

FIBROUS POLYPI OF THE NASO-PHARYNX.

Latin Eq.—Polypi fibrosi pharyngis nasalis. Polypi naso-pharyngei.
French Eq.—Polypes fibreux du pharynx nasal.
German Eq.—Nasenrachenpolypen.
Italian Eq.—Polipi fibrosi della faringe nasale.

DEFINITION.—*Tumours of fibrous structure, generally springing from the vault of the naso-pharynx, often extending into one of the nasal fossæ or even into the antrum, or reaching down in the pharynx to the epiglottis, and when of large size giving rise to great disfigurement of the face, to obstruction of the nose, and sometimes to considerable dyspnœa. These tumours, which are nearly always found in males between the ages of fifteen and twenty-five, are generally solitary, bleed very readily when touched and sometimes spontaneously, have a marked tendency to recur after removal, and show a disposition to arrest of development or even atrophy after the age of twenty-five.*

---

[1] "Trans. Intern. Med. Congress." London, 1881, vol. iii. p. 290.
[2] Op. cit. p. 70.
[3] Intern. Med. Congress, Brussels, 1875.

History.—Although mention is frequently made by the older writers of polypi hanging from the back of the nasal passages into the pharynx, the literature of naso-pharyngeal fibromata may be said to begin with Manne's[1] account of his method of removing such growth, which was published in the early part of last century. Soon after the subject was briefly referred to by Garengeot,[2] and a few years later Manne[3] published a second tract containing some additional cases. Examples were recorded by Taranget[4] and Eustache,[5] and a somewhat elaborate memoir on naso-pharyngeal polypi, valuable even now for the number of carefully-related cases which it contains, was presented to the Royal Academy of Surgery of Paris by Icart,[6] in 1731. In Levret's[7] work on polypi some valuable suggestions were made for the removal of fibrous growths of the naso-pharynx, chiefly by means of ligature, of which method this ingenious surgeon was the inventor. Morand[8] afterwards succeeded in removing a polypus with his fingers alone, by what he called "ébranlement"—that is to say, by rocking the tumour on its base between one finger introduced as far as possible into the nostril, and one or two fingers of the other hand passed up behind the soft palate. A few years later Nannoni[9] removed a large naso-pharyngeal growth by Manne's method. Early in the present century Whately[10] devised an ingenious plan for guiding scissors or cutting-forceps to the base of such tumours. In 1816 Ansiaux[11] reported a case in which he used Manne's method, and failing to get the growth away with forceps, destroyed it by repeated cauterizations. In 1832 Syme,[12] in dealing with a naso-pharyngeal polypus, for the first time removed the upper jaw as a preliminary step towards extirpation of a tumour not connected with that bone itself. Mott,[13] of New York, was referred to by Syme as claiming to have excised the upper jaw for naso-pharyngeal polypus at about the same date, but I have not been able to find any record of his case. In 1834 Dieffenbach[14] published a number of cases in which he had removed fibromata with the bistoury, scissors, and forceps, generally dividing the soft palate as a first step. This, as already shown, had been frequently done before, but solely for the purpose of opening a freer way of access to the tumour, whereas Dieffenbach was, so far as I am aware, the first to point out how valuable this measure may be in itself for the relief of the urgent dyspnœa often caused by the presence of a large fibrous polypus in the naso-pharyngeal region. Blandin[15] put in practice with some success a method which is merely Morand's "ébranlement" carried out with forceps instead of the fingers. In 1840 Flaubert[1] removed the whole of the upper jaw for the eradication of a growth which had baffled several previous attempts to remove it by ordinary means. He was apparently under the impression that his was the first operation of the kind, and, in fact, ablation of the superior maxillary for disease unconnected with that bone is, even now, spoken of by French writers as "Flaubert's operation." It has been shown, however, that he was anticipated, both in the conception and the performance of this operation. Adelmann[2] reported a case of a very large naso-pharyngeal polypus which (besides other ravages) had perforated the hard palate. This opening, enlarged by division of the soft palate with the knife, was used as a way of access to the tumour. This possibly suggested to Nélaton[3] his plan of trephining the hard palate, which, though rarely if ever practised in this country, has apparently found great favour among French surgeons. Nélaton devoted much attention to naso-pharyngeal growths, their attachments, and the means of extirpating them. Although little is to be found on the subject in his own writings, his views have been fully set forth, and his cases and methods of treating them have been related, by several of his pupils.[4] Chassaignac,[5] Langenbeck,[6] Huguier,[7] Demarquay,[8] and Ollier[9] have invented different methods of "temporary resection" of the bony roof of the nose or of part of the upper jaw, whilst Roux[10] has suggested a method of "mobilizing" the whole of the upper jaw, enabling the surgeon to separate the two maxillaries, and thus obtain the widest possible view of the pharynx and base of the skull. This formidable procedure, however, has never been attempted on the living subject. The operations performed by Langenbeck and Von Bruns were described in 1872 by Paul Bruns,[11] who claimed for these surgeons the merit of devising the methods which are generally attributed to Huguier and Chassaignac. An elaborate article was published by Gosselin and Denonvilliers,[12] which has served as a very useful storehouse for subsequent writers on naso-pharyngeal growths. Maisonneuve[13] modified Manne's operation by making a "button-hole" in the soft palate instead of completely dividing it. On the other hand, Nélaton's procedure was altered by Richard,[14] who trephined the hard palate without dividing the velum. A very full account of naso-pharyngeal growths was given in 1864 by Robin-Massé,[15] who wrote as a professed follower of Nélaton. Several English and American surgeons have reported cases of naso-pharyngeal polypi, for the removal of which severe surgical measures were found necessary; among them may be mentioned Bryant,[1] Cheever,[2] Rouse,[3] Thomas,[4] Waterman,[5] Clark,[6] Cooper Forster,[7] Whitehead,[8] Sands,[9] Berkeley Hill,[10] MacCormac,[11] Ratton,[12] Ogilvie Will,[13] and Henry Morris.[14] A good description of the various operative methods of dealing with these growths was published by Sands,[15] in 1873, and in the following year Cheever,[16] in describing a new plan of temporary displacement of the upper jaw, compared the different "preliminary operations" together in a very judicial spirit. A short but complete essay on naso-pharyngeal tumours was published in 1878 by Bensch,[17] and Spillmann's[18] recent article on the same subject is full of information. The latest contribution to the literature of these growths is an instructive paper by R. P. Lincoln,[19] giving the results of different modes of treatment in fifty-eight cases.

---

[1] "Dissertation curieuse au sujet d'un Polype extraordinaire qui occupoit la Narine droite, qui bouchoit les deux fentes nasales, et qui descendoit par une grosse masse extirpée à un pastre du Dauphiné." Avignon, 1717.

[2] "Traité des Opérations de Chirurgie." Paris, 1731, t. iii. p. 50, et seq.

[3] "Observation au sujet d'un Polype extraordinaire." Avignon, 1747.

[4] "Documents inédits de l'Académie R. de Chirurgie," republished by Verneuil; see "Gaz. Hebd. de Méd. et de Chir." June 15, 1860, p. 388.

[5] Ibid.

[6] Ibid. July 20, 1860, p. 465.

[7] "Obs. sur la Cure radicale de plusieurs Polypes." Paris 1771.

[8] "Opuscules de Chirurgie." Paris, 1772, 2me partie, p. 196.

[9] Nessi: "Istituz. di Chirurgia." Venezia, 1787, p. 228.

[10] "Cases of two extraordinary Polypi removed from the Nose." London, 1805.

[11] "Clinique Chirurgicale," t. viii. Liège, 1816, p. 137, et seq.

[12] "Edin. Med. and Surg. Journ," vol. xxxvii. p. 322.

[13] Ibid. The statement rests on a private letter from Mott.

[14] "Chirurgische Erfahrungen." Berlin, 1834. Dritte und Vierte Abtheilung. p. 236, et seq.

[15] "Dict. de Méd. et de Chir. prat." Art. "Polypes." Paris, 1835, t. xiii.

---

[1] "Arch. Gén. de Méd." 1840, 3me série, t. viii. p. 436, et seq.

[2] "Untersuchungen über Krankhafte Zustände der Oberkieferhöhle." Dorpat und Leipzig, 1844.

[3] Botrel: "D'une Opération nouvelle dirigée contre les Polypes naso-pharyngiens." Paris, 1849. Nelaton's first operation was done in 1848.

[4] Botrel, Desgranges, D'Ornellas, Vanthier, Robin-Massé.

[5] "Traité des Operations chirurg." t. ii. p. 448.

[6] "Deutsche Klinik." No. 48, 1859.

[7] "Bull. de l'Academie de Med." Paris, May 28, 1861.

[8] "Gazette Hebdomadaire." Aug. 29, 1862, p. 554.

[9] "Bull. de la Soc. de Chir." 1866, p. 263, et seq.

[10] "Gazette des Hôpitaux." July 30, 1861.

[11] "Berlin klin. Wochenschrift." vol. ix. pp. 138 and 149.

[12] "Compendium de Chirurgie pratique," vol. iii.

[13] "Gazette Hebdomadaire." Sept. 2 and Sept. 10, 1859, p. 612.

[14] Beuf: "Des Polypes fibreux de la Base du Crâne." These de Paris, 1857

[15] "Des Polypes naso-pharyngiens." Paris, 1864.

---

[1] "Trans. Path. Soc." London, vol. xviii. p. 107.
[2] "Boston Med. Surg. Journ." March 11, 1869.
[3] "Lancet," Feb. 27, 1869.
[4] Ibid. May 1, 1869.
[5] "Boston Med. Surg. Journ." April 8, 1869.
[6] Ibid. Oct. 19, 1871.
[7] "Lancet," May 20, 1871.
[8] "New York Med. Record," Jan. 2, 1872.
[9] "Brown-Séquard's Arch. of Med." June, 1873.
[10] "Lancet," June 20, 1874.
[11] "St. Thomas's Hosp. Rep." 1875, p. 65, et seq.
[12] "Lancet," Nov. 3, 1878.
[13] Ibid. Dec. 6, 1879.
[14] "Med. Times and Gaz." June 4, 1881; and Ibid. June 11, 1881.
[15] Loc. cit.
[16] "Boston Med. Surg. Journ." 1874, vol. xc. p. 545, et seq.
[17] "Beitrage zur Beurtheilung der chirurg. Behandlung der Nasenrachenpolypen." Breslau, 1878.
[18] "Dict. Encyclop. des Sciences Méd." 1881, 2me série, t. xiii. Art. "Nez."
[19] "Archives of Laryngology." 1883, vol. iv. No. 4, p. 258, et seq.

Etiology.—The disease is decidedly rare. Paget[1] states that he has never had an opportunity of examining any of these growths in the fresh state, and indeed that he has seen very few of them in any condition. It would appear, however, from the numerous cases recorded by French surgeons, that the affection is less uncommon among their countrymen than it is with us. Fibrous tumours of the naso-pharynx generally originate between the ages of fifteen and twenty-five, but they occasionally commence in infancy, and more rarely after the period of adolescence is past. Bensch[2] has collected 118 cases of tumour in the naso-pharynx, many of which, however, for various reasons he excludes from consideration. Some were clearly of malignant nature, others cartilaginous or simply mucous in structure, whilst many of the cases were too incompletely reported to be made use of. Allowing for these omissions, there remain 66 cases, and in 58 of these the patients were males from eleven to twenty-five years of age; 7 of the remaining 8 occurred in boys under ten years of age, whilst in the eighth case the patient was a girl of fourteen.[1] Bensch's table contains examples of patients of *both* sexes[2] over twenty-five years of age, but even when the tumours were fibrous in structure, these cases had not, according to Bensch, presented the *clinical* features which are considered to be truly characteristic of naso-pharyngeal fibromata. Lincoln's statistics comprise 59 examples of naso-pharyngeal tumour, reported in the period from 1867 to 1873, and of these probably not less than 38 were genuine fibromata, in all of which the patients were males under the age of twenty-five. Nélaton,[3] indeed, went so far as to say that he did not know of a single authentic example of true naso-pharyngeal fibroma becoming developed in a female of any age, or in a male over thirty-five. Whilst granting that the law thus laid down is too absolute, the fact remains that instances of the disease occurring in women must be looked upon as altogether exceptional.

---

[1] "Lectures on Surgical Pathology." London, 1870, 3rd ed. p. 475.
[2] Op. cit. p. 106, et seq.

There is no evidence that the affection is hereditary, though one congenital case has been recorded.[4]

The causes which lead to the development of naso-pharyngeal fibromata are unknown, but the disease is probably due to an irregular evolution, during the growing period, of a tissue which under normal conditions is exceptionally abundant on the under surface of the base of the skull. The age (fifteen to twenty-five) at which these growths are most prone to originate is precisely the time at which many of the fibrous tissues of the body are in the most important stage of their development. It is then that the articular ligaments are acquiring their full firmness, and it seems not unlikely that it is to an exaggerated plastic activity during this phase of development that these terrible growths owe their origin.

Symptoms.—In the early stages of the complaint the patient becomes aware of some obstruction of one or other nostril, and suffers from a disagreeable feeling at the back of the nose. As the disease develops, both nasal passages generally become completely obstructed, and if the growth hangs low in the pharynx there is often considerable dyspnœa. There is usually deafness of one ear, and sometimes both sides are affected. The articulation is frequently indistinct, and even unintelligible, from pressure on the soft palate, whilst dysphagia is occasionally a troublesome complication. A curious symptom which has been observed in many of these cases is drowsiness, the patient sometimes falling asleep even when standing upright. Whately[1] gives remarkable illustrations of this symptom in the case of his patients, one of whom would fall asleep in his shop in the act of serving a customer, or even when on horseback in the street; whilst another, who was a barber's apprentice, went to sleep when curling a customer's hair, and dropped the hot iron on his head. A great sense of fatigue accompanies this drowsiness. There is generally an abundant purulent secretion, which is sometimes of a fetid character. Epistaxis is of almost constant occurrence, and is often very severe. Thus Whately[2] mentions that in one of his cases the patient bled at the nose on three different occasions at intervals of a year, the hæmorrhage each time lasting six days, and the amount of blood lost being between four and five pints. The bleeding is in many instances so frequent and profuse that the patient is reduced to a dangerously anæmic condition.

---

[1] This case is reported as that of a woman aged twenty-five, but she had suffered from the complaint eleven years.

[2] Among these is one of Verneuil's ("Bull. de la Soc. de Chir." 1873, t. ii. 3me série, p. 347), in which the patient was a woman aged sixty-two.

[3] "Rapport sur les Progrès de la Chirurgie," by MM. Denonvilliers, Nélaton, Velpeau, &c. Paris, 1867, p. 325.

[4] Voisin; cited by Verneuil, "Gaz. Hebd." 1860. From "Documents inédits tirés des Archives de l'ancienne Académie de Chirurgie."

By means of posterior rhinoscopy the growth can be seen at an early period of the disease, and it can also be felt with the finger. It is generally smooth, hard and unyielding, red or purple in colour, and often ulcerated and covered with sanious secretion. The tumour is usually pedunculated, the stalk, however, in most cases being broad. There has been much controversy as to the exact seat of implantation of these fibromata. The usual opinion is that they may spring from the vomer, the inner surface of the pterygoid processes, the front of the upper surface of the upper cervical vertebræ, or, in fact, any part of the roof or lateral walls of the naso-pharyngeal cavity. Nélaton,[3] however, whose teaching has been widely accepted in France, holds that the primary point of origin is in all cases the periosteum covering a limited area on the under surface of the base of the skull corresponding to the basilar process of the occipital and the body of the sphenoid bone. He maintains that where the tumour appears to be attached to other parts, either in the naso-pharynx or the nose, these are merely points where secondary adhesions have been contracted in the course of expansion of the growth. It may, at least, be admitted that this view is correct in the great majority of cases. In order to ascertain its exact origin, it is often useful to introduce a probe through the nostril while the finger is in the mouth, for by this means the polypus can be moved and its relations more easily made out. As the mass enlarges, it becomes visible in the pharynx, whilst in other cases where it hangs down into the throat, additional room can be obtained by drawing the velum forwards (see p. 247, et seq.).

---

[1] Op. cit. pp. 3 and 20.

[2] Op. cit. p. 2.

[3] Robin-Massé, op. cit. p. 12.

The subsequent symptoms depend on the direction which the tumour may take in its development. If it extends towards the throat it presses the soft palate forwards and interferes with deglutition. At the same time it generally causes inflammation, which may spread along the Eustachian tube, set up catarrh of the middle ear, and thus give rise to considerable deafness. If the tumour grows into the nose it may separate the nasal bones from each other, flatten out the bridge, at the same time pushing the eyes farther apart and making them bulge almost out of the orbits, thus producing the hideous deformity known as "frog-face." It may also press on the lachrymal canal and cause epiphora. Should the mass extend outwards it may displace the eyeball, causing exophthalmia, and even setting up destructive inflammation of the eye, or it may reach into the antrum, giving rise to a large swelling in the cheek. A similar effect is produced when the growth projects through the pterygo-maxillary fissure and extends to the cheek beneath the zygoma. The most dangerous extension is upwards through the base of the skull, the cranial cavity being opened, and the substance of the brain pressed on or destroyed by the invading mass. It is remarkable, however, that the cranium may be perforated or eroded over a considerable area by the tumour without any cerebral disturbance being produced.[1]

Diagnosis.—In the early stages the disease can generally be recognized with the rhinoscope and by digital examination, and when well advanced it can scarcely be mistaken for any other affection. It is often impossible to distinguish between fibrous tumours and sarcomata except by microscopic examination, but the age and sex of the patient greatly assist in arriving at a correct opinion. Cartilaginous tumours are so rare in the naso-pharynx, that they may be excluded from consideration, and bony growths have never been observed in that region. Occasionally curious and almost unavoidable mistakes have been made. An instance of this is the well-known case in which Vacca Berlinghieri[1] endeavoured to remove what appeared to be a polypus, but proved to be a neuroma of the size of a peach on the second division of the fifth nerve. The case already mentioned (p. 364), in which a hernia of the brain simulated a polypus, may be again referred to. Sometimes the ophthalmoscope may reveal evidence of pressure on the optic nerve, but in a case reported by Ollier[2] cerebral symptoms occurred without any atrophy of the disc having been observed.

---

[1] See several cases in a thesis by Petit, "De quelques Considérations sur les Polypes naso-pharyngiens et leur Propagation au Cerveau." Paris, 1881, pp. 25, 26, 32, and 37.

Pathology.—Fibrous tumours of the naso-pharynx present the ordinary characters of fibromata. They are exceedingly dense, and only differ from similar growths in other situations in being, as a rule, destitute of elastic fibres. The vessels in the substance of the tumour are usually small, whilst those of the investing membrane are often of large size. According to Gross,[3] all these vessels have very brittle walls, and it is to this peculiarity that he attributes their proneness to bleed, a tendency which is further favoured by the fact that the vessels are imbedded in a dense fibrous network which does not allow of their retraction when cut. Muron,[4] who made a careful examination of a growth removed by Verneuil from a boy between fifteen and sixteen years of age, states that in that case the vessels, which were exceedingly numerous, had for the most part a more or less embryonic structure. The walls of the smallest consisted merely of a single row of slightly fusiform cells, others had two such rows, whilst some had three or four. The vessels presenting a fully organized structure with the ordinary three coats were extremely few in number. Occasionally a considerable portion of the tumour may be of true erectile structure,[5] and in such cases hæmorrhage is, of course, particularly likely to occur. Virchow[6] suggests that this is in some cases due to an extension of the cavernous structure normally covering the turbinated bones.

---

[1] "Arch. Gén." t. xxiii. p. 431.
[2] "Bull. de la Soc. de Chirurgie." 1866, p. 264.
[3] "System of Surgery." Philadelphia, 1872, 5th ed. p. 371.
[4] "Bull. de la Soc. de Biologie." July 3, 1869, p. 223.
[5] E. Neumann: "Virchow's Archiv." Bd. xxi. p. 280.
[6] "Die Krankhaften Geschwulste." Bd. iii. p. 463.

Prognosis.—This is unfavourable, unless the disease be recognized and treated at a very early stage. The only satisfactory feature in these growths is that they do not tend to increase, but rather show a disposition to become absorbed, after the age of twenty-five. If, therefore, by repeated removal, the spread of the disease can be kept within bounds, its spontaneous arrest may fairly be looked for when the period of adolescence is past. An example of the disappearance of a fibroma without any treatment whatever has been related by Lafont.[1] The patient was a man, aged twenty-four, who had suffered from the characteristic symptoms for three or four years, and who when seen had a large naso-pharyngeal growth with prolongations into the nose and cheek. As the symptoms were not urgent, surgical measures were postponed, and a few months later the patient returned with hardly a trace of the tumour remaining. Fibrous tumours of the naso-pharynx have also sometimes sloughed away. In an instance related by Birkett[2] this took place after repeated hæmorrhages, for which deligation of the left common carotid had been necessary. Another example[3] of sloughing of a naso-pharyngeal growth, which had recurred after evulsion with forceps, was seen in a woman in St. George's Hospital. In this case it is stated that the tumour disappeared "so entirely . . . . that no trace could be discovered of any part remaining."

Treatment.—The method of dealing with these growths is likely to undergo a fundamental change. Until a comparatively recent period they had, as a rule, attained considerable dimensions before their true nature, or in some cases, their very existence, was discovered. Now, however, that the nose and naso-pharyngeal region can be thoroughly examined by direct inspection, fibromata are sure to be observed at a stage when they are amenable to treatment of a tolerably mild nature. It is not improbable, therefore, that the severe "preliminary operations" presently to be described, may, after a time, become almost obsolete, and that electric cautery applied *per vias naturales* will, in great measure, supersede all other methods. Should the growth, however, have reached a large size before the patient comes under observation, the first question which the surgeon will have to decide is whether an attempt at radical cure should be made, or whether merely palliative measures should be adopted. The natural tendency of the disease to come to a standstill after the twenty-fifth year affords a strong argument in favour of doing nothing in the way of active treatment beyond what is absolutely required for the relief of urgent symptoms. An excellent illustration of this has been furnished by Gosselin.[1] The disease had first attracted the patient's attention by the usual symptoms, when he was between sixteen and seventeen years of age, but it was not till three years later that he sought medical advice. Almost every method was employed for the radical extirpation of the growth, but recurrence was very rapid after each operation, and Gosselin was finally obliged to allow the patient to leave the hospital for the ostensible purpose of recruiting his health before submitting to further measures. But at this time his face was hideously deformed, there was distinct evidence of commencing pressure on the brain, and his vital strength was at the lowest ebb. Gosselin owns that he looked upon the lad as inevitably doomed to death at no very remote date. He saw his patient once more, however, when he had reached the age of five-and-twenty, and was astonished to find that, although no treatment whatever had been attempted in the meantime, all trace of the growth had disappeared. Gosselin is, therefore, strongly of opinion that whilst urgent symptoms, such as difficulty of breathing or swallowing, or great loss of blood from the nose, should, if possible, be palliated by the removal of part of the growth, the bulk of it should be left alone. If, when adolescence is complete, the mass is still unabsorbed, thorough eradication may be attempted with a fairly well-founded hope that there will be no return of the disease.

---

[1] "Gaz. Hebdom." January 15, 1875, p. 37.

[2] "Brit. Med. Journ." February 13, 1858, p. 119.

[3] Ibid. January 23, 1858, p. 61.

Electric cautery is, as already remarked, the plan of treatment which will probably prevail in the future. It is safe and easy of application, and Lincoln's[2] recently published results conclusively show that it is thoroughly effectual, when the growth is of moderate size. He has used it in three cases, in none of which has there been any sign of recurrence since the time of operation. Two of the patients have remained free from the disease for more than eight years, and the third has continued well during nearly eleven months. It is to be noted that the ages of those patients were respectively fifteen, seventeen, and twenty-one, so that all were within the period when the growth of fibromata is, as a rule, most active. Lincoln[1] quotes cases treated by electric cautery by Gulcke and Roth; in the former there had been no recurrence during four and a half years, whilst in the latter the patient had remained free from disease for two and a half years.

---

[1] "Clinique Chirurgicale de l'Hôpital de la Charité." Paris, 1873, t. i. Leçon 8me, p. 92.

[2] "Archives of Laryngology." 1883, vol iv No. 4, p. 258, et seq

The best method of using electric cautery in these cases is, if possible, to remove the growth within the galvanic écraseur passed through the nose or mouth. The stump should afterwards be thoroughly destroyed by electric cautery applied at such intervals of time as may seem desirable; once a week will be sufficient in most cases. The simplest and most convenient instrument for this purpose is Lincoln's post-nasal electrode (Fig. 61, p. 273).

Amongst other modes of treatment may be mentioned *electrolysis*, *ligation*, *removal with the écraseur*, *evulsion*, *excision*, *crushing*, *gouging*, *actual cautery*, and the application of *escharotics*.

Electrolysis can be carried out by means of any battery generating a continuous current of moderate strength. The operator should introduce one or more curved needles connected with the negative pole into the tumour behind the uvula, whilst the current from the positive pole is conducted to the growths by means of a needle passed through the nose, or a sponge-electrode placed in contact with the sternum. A convenient needle for the purpose of applying electrolysis to post-nasal tumours has been invented by Cohen.[2] The operation should be continued for ten or fifteen minutes at a time, and it may be made every day, or on alternate days. Very successful examples of this mode of treatment have been recorded by Nélaton,[3] Paul Bruns,[4] Ciniselli,[5] Fischer,[6] and

---

[1] "Archives of Laryngology." 1883, vol. iv. No. 4, pp. 274, 275.

[2] "Diseases of Throat and Nasal Passages." New York, 1879, 2nd ed. p. 270.

[3] Robin-Massé: "Des Polypes naso-pharyngiens." Paris, 1864, p. 78.

[4] "Berlin klin. Wochenschr." July, 1872, No. 27, p. 321: No. 28, p. 336.

[5] "Gazette Médicale." 1866, p. 223.

[6] "Wien. med. Wochenschr." 1865, No. 61.

Lincoln.[1] In Nélaton's case a bulky growth, which bled very easily, and which had resisted the cautery and escharotics, was dispersed by electrolysis in six sittings. In that of Bruns, a large tumour, which had baffled previous efforts to remove it with the snare, was destroyed by electrolysis. In this instance, however, the treatment had to be continued for eleven months; and one hundred and thirty sittings, each lasting about a quarter of an hour, were required. In Lincoln's case electrolysis was used as a palliative measure, the patient's weakness making a radical operation unadvisable. There were twenty-two sittings, the treatment being continued for about a year. At the end of that time the tumour had "shrunk very much in all dimensions, and the patient's health was so much improved that the remaining portion of the growth could be removed with the écraseur." In Gosselin's[2] case, already referred to, electrolysis was one of the methods resorted to, and it was tried under fair conditions. It was found, however, that although some diminution in the bulk of the tumour was effected at each sitting, this was so slight as to be regained by the natural process of growth by the next time electro-puncture was applied, so that no real progress was made. It may be added, that in this case the operation was so painful as to be extremely dreaded by the patient, who, nevertheless, had borne, without much complaint, repeated examinations and many attempts to remove his growth by cutting, ligature, and caustics.

Ligation.—Ligatures have been employed for the removal of these growths from an early period in the history of surgery. When the tumour has been thoroughly exposed by a "preliminary operation," a ligature can usually be applied with ease, but when strangulation has to be done *per vias naturales* there is often the greatest difficulty in placing the ligature round the stalk of the growth. To accomplish this an immense variety of instruments have been invented; indeed, almost every surgeon who has had occasion to apply this method has devised some fresh arrangement. Perhaps the simplest plan is that recommended by Dubois.[3] This consists in passing a double ligature through a piece of elastic catheter fifteen to thirty centimetres in length, to which a piece of coloured thread is attached. As the ends of the ligature are gradually drawn out through the nostrils by means of Bellocq's sound, the surgeon, with his fingers in the patient's mouth, carries the open loop over the pedicle of the growth. When the loop is in position, the piece of catheter is removed by means of the coloured thread. An obvious objection to this method is that it is useless in the numerous cases where it is impossible to reach the pedicle with the finger. In carrying out ligation, there is some danger, if the tumour be large, that when it separates it may fall down into the throat during sleep, and cause death by suffocation. In such cases, therefore, a thread should be passed through the body of the tumour, and brought out by the mouth, the two ends being tied round one of the ears. During sleep the patient must be watched in order that the polypus may be at once withdrawn should it become detached.

---

[1] "Naso-pharyngeal Polypi." St. Louis, 1879, p. 6, et seq. Reprinted from the "St. Louis Medical and Surgical Journal."

[2] Loc. cit.

[3] "Gazette des Hopitaux," February, 1863.

The great advantage of the ligature is that the danger from hæmorrhage during the operation is reduced to a minimum. The disadvantage is that it is often extremely difficult to apply the ligature, except after a "preliminary operation," and that when the mass has come away a stump is left behind from which the growth may sprout anew.

Removal with the Écraseur.—For this purpose a strong, slightly curved instrument must be used, and a loop of suitable size having been made, it should be directed upwards behind the uvula, and made to encircle the growth as close to its root as possible. In some cases it will be found easier to pass the wire round the tumour by pushing it, bent double, through the nose. In either case, when the wire is round the growth, its ends should be threaded through the eyes of the écraseur, and the loop gradually tightened.

Evulsion.—As in the case of mucous polypi, evulsion with forceps has its advantages. Instead, however, of the delicate instruments which are used in dealing with soft growths, very powerful forceps are required for fibrous tumours. They must be curved at an obtuse angle, and the blades should be rough, or even toothed, to enable the operator to get a firm grasp of the tumour.

It is desirable to seize the growth as near its base as possible, and twist the pedicle as much as the space will permit. Such is the resisting character of these growths, however, that even when very strong forceps are employed, their blades are often wrenched so as to become useless.

Occasionally the tumour may be seized with the fingers and torn off, but this can seldom be done until the origin of the polypus has been well exposed by a "preliminary operation."

In any case it is most important to follow any offshoots of the growth which may project into the nose, sphenoidal fissure, or antrum, and to root them out thoroughly. The great advantage of evulsion is that when the tumour is not very large it can be removed in this way without any "preliminary operation," and that it can often be torn away by the roots. The objection to it is that the growth is sometimes so extremely dense that it altogether resists any reasonable degree of force,[1] and serious accidents may result from injudicious violence. Though Icart[2] has related an instance in which he brought away a fragment of the ethmoid bone as large as a shilling, without any bad consequences ensuing, it must not be forgotten that two of Ollier's[3] patients died from cerebral complications after evulsion. In one of these, however, the growth was found, on post-mortem examination, to have invaded the middle cerebral lobe. Cooper Forster[4] also lost a patient twelve days after evulsion, and the necropsy showed fracture of the cribriform plate of the ethmoid with general arachnitis and localized sloughing of the cerebral substance. A great part of the tumour having been left behind, it appears probable that these lesions were due to the operation.

Excision with a curved blunt-pointed bistoury was frequently performed by Dieffenbach, who, though he sliced these growths in the freest manner, did not meet with any dangerous hæmorrhage; this experience, however, is of a very exceptional character, for Deguise,[5] Verneuil,[6] and Duménil[7] have reported cases in which death occurred from the furious bleeding which took place when the tumour was divided. Whately succeeded in curing a very severe case by excision, or rather amputation, with a curved knife. His mode of operation was ingenious, and at the same time simple. A string was first passed through the nose round the growth, and into the pharynx, from which it was drawn out of the mouth. The end of the string was then threaded through a small eye near the point of the knife, and the nasal extremity of the string being pulled tight by an assistant, whilst the other was held in the surgeon's left hand, the knife with its point carefully guarded was run along the string to the upper part of the pharynx, where the edge was guided to the base of the tumour, which was cut through. Although the diameter of the growth at the point of section was 2 by $1\frac{3}{8}$ inches, there was no serious bleeding.[1] In spite, however, of this experience of Dieffenbach and Whately, the danger of hæmorrhage renders their plan of treatment unworthy of imitation.

---

[1] This has been especially observed by M. Ollier, the well-known surgeon of Lyons, who, considering their great rarity, has had an unusually large experience of these tumours.

[2] Loc. cit.

[3] Spillmann: "Dict. Encyclop. des Sciences Médicales," 2e serie, t. xiii. p. 100.

[4] "Lancet." May 20, 1871.

[5] "Bull. de la Soc. de Chir." March 13, 1861.

[6] Ibid. 1870.

[7] Ibid. June 18, 1873.

Crushing.—This method has never been extensively practised. It was tried by Velpeau[2] with very powerful forceps armed with strong teeth. Different portions of the growth were successively seized, and violently compressed, and in this way a considerable portion of the tumour was destroyed. The crushed portions, together with some of the immediately adjacent parts of the polypus, subsequently sloughed away. Although cases have been reported by Dolbeau[3] and Jarjavay[4] in which this treatment was successful, it is so apt to give rise to septic infection that it has fallen into disuse.

Gouging.—This mode of treatment was once much in vogue. But though a favourite practice in the sixteenth and seventeenth centuries for the destruction of every kind of tumour, it does not appear to have been employed for the removal of naso-pharyngeal polypi till it was advocated by Borelli.[5] The method has since been followed by Guerin,[6] Bonnes,[7] and Herrgott,[8] but it requires the performance of a "preliminary operation," except in cases where the growth is attached to the base of the skull. Under these circumstances the plan is most conveniently carried out by passing an extremely fine chisel through the nose, and pushing it along the vault of the pharynx.

---

[1] "Cases of Two Extraordinary Polypi, &c." London. 1805. p. 14.

[2] "Bulletin de Thérapeutique." 1847.

[3] Spillmann: Loc. cit. p. 101.

[4] Ibid.

[5] "Gaz. des Hôpitaux." 1860. p. 179.

[6] "Bull. de la Soc. de Chir." June 24, 1866.

[7] Ibid. July 14, 1869.

[8] Quoted by Postel: "Des Polypes naso-pharyngiens." Thèse de Paris. 1867.

Although gouging is of very limited application for the actual removal of growths, it has been extensively employed for destroying the stump when the bulk of the tumour has been taken away by some other plan. Baudrimont,[1] however, says that out of eight cases operated on by Dieffenbach recurrence took place in seven, in every one of which gouging had been carried out; whilst in the eighth case, in which cauterization was used instead of gouging, there was no recurrence of the disease. Ollier,[2] on the other hand, affirms that he has no confidence in any method of treating naso-pharyngeal growths except by evulsion followed by vigorous gouging, and he is never satisfied that the latter procedure has been thoroughly carried out, unless he can feel that the bony tissue of the basilar process of the occipital bone has been scraped quite bare. Whilst admitting that the periosteum which furnishes the elements for the reproduction of the tumour must be destroyed as completely as possible, a word of warning seems to be called for here against a too energetic use of the gouge. A case has come to the author's knowledge in which a distinguished surgeon, now deceased, actually drove the chisel into the patient's brain whilst scraping the vault of the pharynx.

Thermic Cautery.—The red-hot iron used by the older surgeons has been abandoned in favour of improved methods of applying the actual cautery.

Paquelin's thermo-cautery is available in some cases, and Nélaton successfully employed a simple gas flame for the cauterization of the stump of a tumour which had been removed. For this purpose he used a small india-rubber ball full of gas, connected with an elastic tube, to which suitable nozzles of varying degrees of fineness could be adapted. The nozzle was provided with a stop-cock, so that the flame could be exactly regulated in its application. By this means it was found possible to cauterize the parts very quickly and thoroughly, whilst radiation was so slight that the finger could be held at a distance of a centimetre and a half from the flame without any heat being perceived.

Escharotics.—Various agents of this kind have been employed in different ways. Nélaton treated some cases by the application of nitric acid passed through a suitably curved glass tube. In spite, however, of every precaution the vapour of this acid is apt to escape and give rise to violent dyspnœa. Moreover, to produce any real effect, the remedy must be applied daily for months. In France chloride of zinc paste (pâte de Canquoin) has been recommended by several surgeons, and a special apparatus has been devised by Desgranges[1] for maintaining the caustic in contact, as long as may be necessary, with the part to be destroyed. This consists of a thin metal plate, on the upper surface of which is placed the caustic agent, whilst the apparatus is kept in position by metallic bands which go round the head. Although I have never had an opportunity of trying them in a case of naso-pharyngeal fibroma, I think the caustic darts[2] which I am in the habit of occasionally using in cases of fibrous bronchocele might also here prove of service.

---

[1] "De la Méthode nasale dans le Traitement des Polypes naso-pharyngiens." Thèse de Paris, 1869.

[2] "Traité expér. et clin. de la Régénération des Os." Paris, 1867, p. 185.

French surgeons distinguish two methods of employing cauterization, viz., the *rapid process* and the *slow process*. The former consists in freely cauterizing the stump of a polypus immediately after the bulk of it has been removed. The *slow* cure consists in keeping the base of the growth accessible for some weeks after a "preliminary operation" has been done, and applying the caustic every second or third day. The slow cure can be most conveniently carried out through the wound left after Nélaton's "palatine operation." This procedure, however, is objectionable, as almost necessarily leaving a permanent fissure of the palate; whilst, in the case of operations on the face, the prolonged maintenance of an open wound is likely to lead to hideous deformity.

Preliminary Operations for gaining Access to Naso-pharyngeal Tumours.—Although attempts have been made to dilate the orifice of the nostril by means of serpentary root, gentian, sponge, and more recently by laminaria, these methods are practically of little value, and, owing to the frequently inaccessible situation not less than to the large size and numerous offshoots of the growths, it often becomes necessary to expose the tumour by a preliminary surgical operation. This necessity was perceived at a very early period, and on referring to the short historical retrospect prefixed to the article on "Nasal Polypi" (p. 353, et seq.), it will be seen that Hippocrates recommended that the nasal cavity should be laid freely open in cases where the application of the actual cautery was judged necessary. An operation of this kind seems to have been frequently done in the sixteenth and seventeenth centuries, but it had fallen into disuse until revived by Dieffenbach.[1] It has since been often performed with various modifications according to the exigencies of particular cases. The older surgeons carried the incision down the centre of the nose, but, with the view of concealing the scar as far as possible, Garengeot[2] suggested that the cut should be made along the genio-nasal furrow.

---

[1] "Gazette Hebdom." June 30, 1854, p. 633, et seq.

[2] These consist of one part of chloride of zinc to one or two parts of wheat flour.

At a later period more severe procedures came into use, the naso-pharynx being laid open by resection of the upper jaw, or the growth being reached by division of the hard palate. Hence the following preliminary operations for the removal of naso-pharyngeal tumours have come to be recognized, viz., 1, *nasal*; 2, *maxillary*; and 3, *palatine*.

These procedures are in themselves attended with considerable risk. Sédillot[3] and Demarquay[4] each lost a patient from hæmorrhage in the course of the "preliminary operation," and in twenty-one cases collected by Lincoln,[5] in which a "preliminary operation" was done, death took place on the table in three,[6] whilst in a fourth[7] the patient succumbed within a few hours. In a fifth[8] instance hæmorrhage very nearly proved fatal during the operation. If Lincoln's statistics are accepted in the gross they show still less favourable results, for in thirty-nine cases in which "preliminary operations" were performed death quickly ensued in eight. In some of these, however, the disease was decidedly malignant, and they have, therefore, been excluded from consideration. Even as regards the twenty-one cases of undoubted fibroma, it must not be forgotten that a "preliminary operation" was presumably judged necessary because the tumour was very large, and the mortality may, therefore, have been in great measure due to the unavoidable violence which must sometimes be used in separating the mass from its attachments. The feeble and anæmic condition of the patients in such circumstances has also to be taken into account. It is hardly fair, therefore, to compare the statistics of cases in which "preliminary operations" have been performed with those in which a cure has been effected by means of electric cautery or any other simple method of treatment.

---

[1] Op. cit.

[2] "Traité des Opérations de Chirurgie." Paris, 1731, 2e éd. t. iii. p. 53.

[3] Spillmann: Op. cit. p. 145.

[4] Ibid. p. 146.

[5] Loc. cit. pp. 264—281. Lincoln's tables include altogether fifty-eight cases of naso-pharyngeal tumour. Of these seven were unquestionably malignant, three were fibro-mucous, whilst in ten the nature of the growth is either not stated, or from internal evidence (age or sex of the patient, cause of the disease, &c.) may be judged to have been not truly fibromatous. I have, therefore, reckoned only thirty-eight of Lincoln's cases as examples of the disease treated of in this article, and even a few of these must be looked on with some suspicion.

[6] Verneuil: "Gaz. des Hôpitaux," Aug. 9, 1870; Berkeley Hill: "Lancet," June 20, 1874; H. Morris: "Med. Times and Gaz." June 4, 1881.

[7] Ratton: "Lancet," Nov. 3, 1878.

[8] Sands: "Brown-Séquard's Archives of Scien. and Pract. Med." June, 1873.

The various "preliminary" procedures must now be described in detail.

Nasal Operations.—Dupuytren[1] suggested opening the nasal fossa by an incision carried round the base of the nose, detaching the cartilages from the bone, thus enabling the operator to tilt up the tip of the organ, and explore the anterior orifice of the nares. Syme enlarged the aperture of the nostril by dividing the upper lip in a vertical direction from a point midway between the septum and the ala of the affected side. The two flaps were then dissected well back on each side. A procedure, however, which, besides exposing the nasal cavity more freely, has the advantage of not causing an unsightly cicatrix, has been proposed by Rouge.[2] The following is his own description of this operation: "The patient is anæsthetized, and placed with his head bent towards the right side to allow the blood to escape, whilst the operator stands at the right side of the bed. Seizing the upper lip, near the commissure, with the thumb and index finger of the left hand, I lift it up a little, whilst an assistant does the same on the other side. The lip being so held and stretched out, I incise the mucous membrane in the gingivo-labial groove from the first molar tooth on the left side to the corresponding point on the right, the centre of this incision being at the frenum of the lip, which is divided at the root. I rapidly cut through the tissues in their whole thickness, and reach the anterior nasal spine, over the prominence of which the knife should be carried, detaching the cartilaginous part of the septum at its base. This often suffices, for by raising the nose there is room to introduce the finger into the nasal fossa, and a good view can be obtained of its cavity when the blood has been sponged out. If, however, this does not suffice, the alar cartilages should be separated from their attachment to the upper jaw with scissors, and the nose being thus completely detached, should be thrown upwards upon the forehead, when the whole extent of the anterior opening of the nares will be exposed. If the uncut portion of the septum prevents the turning back of the nose, it should be divided with scissors. When the operation is finished, the wound should be carefully cleansed, the blood and clots being washed away with water; the lip is then replaced, and union takes place without any sutures being required."[1]

---

[1] "Journal de la Clinique." 1830, t. ii.

[2] "Nouvelle Méthode Chirurgicale pour le Traitement de l'Ozène." Lausanne, 1873.

It is sometimes, however, necessary to open the nasal cavity from the face. This may be partially done by slitting the nostril in the middle line from below up to the lower edge of the nasal bone. If this does not afford sufficient space, the skin incision should be prolonged to the root of the nose, and the nasal bones separated from each other in the middle line with scissors or bone-forceps; the whole side of the nose, consisting of the nasal bone, the os unguis, the nasal process of the upper jaw, with the lateral and alar cartilages, can now be pressed outwards upon the cheek and held there by an assistant, while the surgeon examines the attachments of the growth and attempts to remove it through the gap thus formed. As Roser[2] says, "operations of this kind are rendered more easy by the fact that the patients are young, and their bony sutures soft, yielding, and easily dislocated."

Langenbeck's operation, which is practised by many surgeons, is done in the following manner:—The patient lying on his back, an incision is carried from the junction of the nasal and frontal bones downwards along the middle line of the nose to the upper margin of the alar cartilage, from which point a second incision is made outwards along the upper edge of the cartilage of the affected side. The triangular flap thus formed is dissected back, care being taken to avoid injuring the periosteum. The cartilage is next severed from the bone and the os nasi separated from its fellow with bone-forceps. Part of the nasal process of the superior maxillary should then be separated from the body of the bone, the line of section being kept to the inner side of the orbital ridge, in order to avoid injuring the lachrymal canal. The quadrilateral osseous plate thus marked out is now connected with the frontal bone only by the natural suture and by the periosteum and mucous membrane, and it should be forced upwards with an elevator so as to lay open the upper part of the nasal cavity. When the operation has been completed it is recommended that the wound should be kept open for some months in order that any recurrence of disease may be at once observed. MacCormac[1] has performed a similar operation on both sides, but he carried the vertical incision down the cheek instead of along the middle line of the nose.

---

[1] This operation has been done several times in England, but chiefly for the purpose of removing diseased bone from the nasal cavity. See in particular one very successful case by Harrison Cripps in "Lancet," May 5, 1877, p. 643, et seq.

[2] Quoted by Spillmann: "Dict. Encyclop. des Sciences Médicales," 2e série, t. xiii. p. 131.

Chassaignac's operation consists in loosening the attachments of the nose on one side, so as to allow of its being turned over on the opposite cheek. The following are the steps of the procedure :—A transverse incision is made across the root of the nasal prominence, from the inner angle of the orbit on the right side to the corresponding point on the left ; a second cut is next made from the left extremity of the first incision to the outer margin of the left ala at its lower part ; lastly, the knife is carried across the upper lip close under the nose to the external edge of the right ala. The nasal walls are now drilled through in the direction of the first incision, and, a chain-saw having been introduced through the aperture thus made, the upper part of the nasal processes of the superior maxillaries and the ossa nasi are divided from behind forwards. The saw is then carried downwards in the direction of the second incision, cutting through the osseous wall on the left side, whilst the septum and the bones on the right are snipped through with scissors or cutting forceps. Care must be taken not to injure the skin or soft tissues on the right side, as it is on the integrity of these that the vitality of the feature depends when it is replaced. The nose, having been detached in this manner on three sides, can be turned over towards the right "like the lid of a snuff-box," leaving free access to the naso-pharyngeal cavity. When the tumour has been extirpated the parts are to be carefully replaced, and the edges of the wound accurately brought together with sutures.

---

[1] "St. Thomas's Hospital Reports." 1875, p. 65, et seq.

Ollier's operation, which he calls "vertical and bilateral osteotomy of the bones of the nose," is performed as follows:—An incision, somewhat resembling a horse-shoe in outline, is made through the skin from the outer edge of the ala upwards along one side of the nose to its root and down to the edge of the other ala. The knife should be carried at once through all the soft tissues. The bones of the nose are next to be divided in the direction of the first incision with a fine Butcher's saw, held parallel to the plane of the patient's forehead, whilst the cartilages of the septum and alæ should be snipped through with scissors. If necessary, the two small internal nasal arteries must be tied. The nose can now be pulled down, leaving free access to the naso-pharyngeal cavity. When the growth has been removed, the nose is replaced, and the edges of the wound brought together with fine wire sutures. Ollier[1] points out that this procedure does not endanger the vitality of the nose, as its chief arterial supply is left intact. Union takes place very quickly, one patient having been able to blow his nose on the fourth day after the operation.[2] Ample room is afforded for the treatment of the tumour, Ollier himself having removed one weighing more than six ounces and a half,[3] which he says is perhaps the largest naso-pharyngeal fibroma that has ever been removed. He[4] is careful to point out, however, that all noses are not equally suitable for this operation, the long narrow ones being especially unfavourable, and generally rendering it necessary to sacrifice the turbinated bones. When the tumour is at all large, however, the pressure of the mass usually dilates the nasal passages much beyond their normal width, which makes the operation easier and more effectual.

A somewhat analogous method was carried out more than twenty years ago by Lawrence,[5] who, however, loosened the nose from below, leaving it attached only at the root, so that it could be thrown upwards on the brow. He made a cut from the inner edge of each lachrymal sac downwards along the naso-labial furrow to the point of junction of the septum with the upper lip, where the two incisions met. The bones of the nose and the septum were then divided from below with forceps, and the whole feature thrown upwards. The nose was afterwards replaced, and fixed with sutures. Union took place in a few days. The only disadvantage of this plan, as compared with Ollier's, is that the pedicle of the displaced mass is less vascular, and gangrene is, therefore, more likely to take place.

---

[1] "Bull. de la Soc. de Chir." 1866, p. 264.

[2] Ibid.

[3] Ibid.

[4] "Traité expér. et clin. de la Régénération des Os." Paris, 1867, t. ii. p. 484.

[5] "Med. Times and Gaz." 1862, vol. ii. p. 191. Lawrence's operation was undertaken for the removal of mucous polypi

A procedure which may fitly be classed under the head of nasal operations was proposed and carried into execution almost at the same time by two Italian surgeons, Palasciano[1] and Rampolla.[2] This may be briefly described as follows:—A small incision is made to the inner side of the lachrymal sac, which should be partly dissected out and held aside by an assistant; the inner wall of the tear-duct, formed by the *os unguis*, is then pierced with a curved trocar and canula, which is to be pushed into the nasal fossa by the superior meatus. The trocar is next withdrawn, and the canula is twisted so that its concavity looks upwards and passed into the pharynx. Through it a ligature is then passed, which is made to encircle the tumour. The results of the operation have not been brilliant, one of the four cases in which it has been practised having ended fatally, whilst in another abscess of the eyeball ensued, and in the remaining two the growth speedily recurred. The plan has been tersely described by Robin-Massé[3] as simple ligation applied in the most inconvenient way possible.

Maxillary Operations.—These consist of excision, and temporary resection of the superior maxillary bone. The history of these procedures has been already given (p. 505, et seq.).

The superior maxillary bone may be removed in its entirety, or partially, or it may be temporarily displaced. Excision of the upper jaw is done in the following way:—A cut is made from the inner canthus along the side of the nose and carried through the whole thickness of the upper lip at its middle part; it is sometimes necessary to make a second incision from the upper extremity of the one just described, horizontally outwards, about half an inch below the lower margin of the orbit to the malar prominence. Although this second cut is required for removing the superior maxilla when a large tumour springs from any part of that bone itself and causes considerable projection of the cheek, it can generally be dispensed with when the excision is performed for a naso-pharyngeal growth, and thus a very unsightly cicatrix can be avoided. The remainder of the operation cannot be better described than in the words of Heath:[1] "The skin having been reflected in the manner described above, the incisor teeth of the side to be removed are extracted, and a narrow saw with movable back is passed into the nostril. With this the alveolus and hard palate are divided, and the small saw is then applied to the malar process of the maxillary bone (or, if need be, to the malar bone itself), and to the nasal process of the superior maxilla, so as to notch both these points of bone, the division being completed with the bone-forceps. With the 'lion-forceps,' devised by Sir William Fergusson for the purpose, the jaw can be now grasped and broken away from the pterygoid process and the palate bone, any detaining point being severed with the bone-forceps. Lastly, when the bone is quite loose, the infra-orbital nerve is to be divided, and the soft palate dissected off the bone so as to leave as much as possible of it uninjured." Hæmorrhage should be controlled by means of ligatures or the actual cautery, and at the conclusion of the operation the edges of the wound should be brought accurately together with hare-lip pins and the interrupted suture.

---

[1] "Moniteur des Sciences." August 25, 1860, p. 393.

[2] "Bull. de la Soc. de Chir." March and May, 1860.

[3] Op. cit. p. 60.

A method of partial and temporary resection, as already mentioned, was proposed and carried out by Huguier, in the following manner:—A transverse slit having been made in the soft palate, a thread is carried through one nostril by means of Bellocq's sound, and brought out through the wound in the palate; to the end of this thread is fastened a string, which is to serve for making traction on the loosened piece of bone in the way to be presently described. An incision is next carried through the whole thickness of the cheek, from the corner of the mouth to the anterior border of the masseter; a second cut is then made from near the inner corner of the eye, along the genio-nasal furrow, detaching the ala of the nose, and ending in the middle of the upper lip. This triangular flap is dissected back and thrown outwards. The saw is afterwards to be carried horizontally through the upper jaw from immediately above the maxillary tuberosity to just above the floor of the corresponding nasal fossa. The first incisor of the opposite side should be displaced with the elevator, and the floor of the nose sawn from before backwards, but not completely through. The base of the pterygoid process should next be cut through with bone-forceps, thus leaving the lower portion of the superior maxilla separated from the bones of the face, and only connected to them by the mucous membrane covering the palatine vault, which was spared in the division of the floor of the nose. With the forceps used as a lever, traction being at the same time made on the separated portion of bone by means of the string previously passed through the nose and the soft palate, the lower part of the upper jaw can be dislocated into the mouth. The nose and naso-pharynx are now fully exposed, and after the growth has been removed, and the bleeding stopped, the loosened maxillary bone should be replaced, gags should be put between the molar teeth on each side, the wound closed with hare-lip pins, and a bandage passed round the chin and fastened over the top of the head. Considerable trouble is sometimes caused by the displaced fragment not uniting and showing a tendency to fall into the mouth. Huguier, however, secured perfect union by means of a gutta-percha splint, carefully moulded to the alveolar border, and worn for a month or two; he states that the disfigurement left by the operation was slight.[1]

---

[1] "Diseases and Injuries of the Jaws." London, 1872, 2nd ed. pp. 275, 276.

A procedure has been invented by Cheever[2] for the partial resection of *both* upper jaws, of which the following are the steps:—An incision is made from the inner canthus through the soft parts on either side, and carried downwards along the genio-nasal furrow to the middle of the lip. These flaps are next to be dissected back as far as the malar prominences. The body of the superior maxillary must then be cut through with a narrow saw, the line of division passing from the tuberosity forwards under the zygoma into the middle meatus on each side. Lastly, the septum and the alæ should be snipped through with scissors. The upper jaw, which is now attached only at the back part, is to be forced downwards, and the growth removed. The bone is then put back into its place, and firmly fixed in position by wire sutures passed through the malar bones on each side. Cheever claims for this plan that the vascular supply of the bone is not interfered with, since the palatine arch and the alveolar border are left uninjured.

---

[1] Robin-Massé, however, states (Op. cit. p. 86) that from an examination of the patient, made a considerable time afterwards, it appeared that the bone had never firmly united, and that all the teeth growing from it were carious, so that the replaced maxillary simply served as an indifferent obturator.

[2] "Boston Med. and Surg. Journ." 1874, vol. xc. p. 547.

A case which is probably altogether unique has been recorded by Ollier,[1] in which he performed temporary resection of an upper jaw of new formation. He had removed the superior maxillary more than three years previously in order to gain access to a naso-pharyngeal polypus. When the patient again presented himself, a solid bony bridge was found joining the malar bone to the anterior nasal spine. This was divided at each of the points named, and raised, being afterwards replaced when the growth had been extirpated. Union was complete in thirty days.

Palatine Operations.—Division of the soft palate was, as already stated, performed by Manne as a "preliminary operation" for the removal of a naso-pharyngeal polypus. He gives a very meagre description of his procedure, but appears to have divided the velum in its whole length near the middle line, cutting from below upwards with a curved bistoury. This method was subsequently practised by Petit,[2] Morand, Nannoni, Ansiaux, Dieffenbach and others. Levret proposed the division of the pillars of the fauces on each side, with the view of making the curtain of the soft palate more movable. Jobert[3] appears to have modified this plan by incising the velum, beginning at the base of the pillars on each side, and cutting upwards as far as seemed necessary. Maisonneuve[4] improved Manne's operation by leaving the lower edge of the velum undivided. He made a longitudinal incision through the soft palate, commencing close to the posterior edge of the palate bone, and carrying the knife to within one centimetre of the edge of the velum. This aperture he calls the "palatine button-hole." The finger is passed through it to explore the shape and attachments of the growth, which is then drawn through the "button-hole," the sides of which are very elastic. Round the sort of pedicle formed in the mass by this procedure a wire noose is placed, and pushed as far back through the velum as possible ; it is then tightened, and kept in position till the tumour is cut through. Huguier[1] used a transverse " button-hole " in connection with his method of temporary resection of the upper jaw, and Bégin[2] employed this method in combination with division of the nose in front. Adelmann[3] also practised it as part of an extensive operation for the removal of a growth which had depressed the hard palate and caused perforation of the bone in the middle. Nélaton[4] subsequently proposed trephining of the hard palate combined with division of the velum as a means of reaching the tumour to be extirpated, and of watching for any sign of recurrence after removal of the mass. His plan of procedure is as follows :—The soft palate is divided, from its bony attachment to its free border, the cut being carried through the middle of the uvula. This incision should then be prolonged through the tissues covering the hard palate for the posterior half of its extent. From the anterior end of this cut two others should be carried outwards and slightly backwards on each side. These incisions should be made with a strong sharp knife, so as to cut through the periosteum and reach the bone. The posterior layer of the velum being next divided with the bistoury, the soft parts should be raised from the bone, and the two flaps thus formed should be held aside by assistants. The hard palate should be bored through with a perforator at the front part of the space thus exposed, the holes being made at about one centimetre from the middle line. Into these holes the blades of a pair of fine bone-forceps are then inserted, and the intervening portion of the palate is broken through, the separation of the osseous plate being completed, if necessary, by dividing the bone on each side.[5] The fragments of bone, which generally include part of the vomer, should be carefully detached from the mucous membrane, so as to allow of subsequent repair. Through the opening thus made the polypus is removed in whatever way the surgeon may prefer, the wound being subsequently kept open as long as may be desired in order to allow of thorough destruction of the roots of the growth, and the immediate treatment of any recurrence. Botrel[1] suggested Maisonneuve's "button-hole" method in combination with Nélaton's trephining of the hard palate as affording more hope of ultimate perfect healing of the wound.

---

[1] "Traité expér. et clin. de la Régénération des Os." Paris, 1867, t. ii. pp. 492, 493.

[2] Quoted by Garengeot: "Traité des Opérations de Chirurgie" Paris, 1731, t. iii. p. 51.

[3] "Gazette des Hôpitaux," July 22, 1858.

[4] "Gazette Hebdomadaire," September 2, 1859.

---

[1] " Bull. de l'Acad. de Méd." May 28, 1861.

[2] " Nouveaux Éléments de Chir. et de Méd. Opér." Paris, 1838, t. ii. p. 586, et seq.

[3] " Untersuchungen über krankhafte Zustände der Oberkieferhöhle." Dorpat und Leipzig, 1844.

[4] Botrel : " D'une Opération nouvelle dirigée contre les Polypes naso-pharyngiens." Thèse de Paris, 1850.

[5] This operation is not so difficult in actual execution as may appear from the description. When the bones are pressed on by a polypus, they are usually so atrophied as to make it an easy matter to break or perforate them. Ollier (" Traité expér. et clin. de la Régénération des Os," Paris, 1867, t. ii. p. 487) mentions a case in which the hard palate was so thin that it could be pierced with an ordinary pin.

The great danger of hæmorrhage, both during the "preliminary operations" and the actual ablation of naso-pharyngeal fibromata, has been already mentioned, and it now only remains to make a few remarks on the best way of meeting these complications. It is most important to proceed with deliberation, securing the vessels, if possible, as they are divided; and it has been pointed out by Spillmann[2] that it is very desirable not to attack the polypus till the patient has recovered from the anæsthetic, so that he may be able to expectorate any blood which may flow into his trachea. In some cases it may be well to perform tracheotomy and use Trendelenburg's instrument (Vol. i. p. 515) before the "preliminary operation" is commenced, but one case[3] proved fatal in spite—possibly in consequence—of previous laryngotomy. Tying the carotid is seldom of any use unless it has been found beforehand that pressure on the vessel will stop the blood; and in very severe cases the actual cautery is more to be relied on. Ollier plugs the naso-pharyngeal space with sponges after the operation, and this plan is generally adopted by English surgeons.

Notwithstanding all precautions, however, fatal syncope sometimes occurs after removal of these growths, probably owing to the sudden withdrawal of a large mass of blood from the immediate neighbourhood of the brain.[4]

---

[1] Loc. cit.

[2] "Dict. Encyclop. des Sciences Médicales," t. xiii. p. 150.

[3] Ratton: "Lancet," November 3, 1878.

[4] Pozzi's experiments on dogs ("Gaz. Hebd." September 4, 1874, p. 576) clearly show that death is more rapidly caused by the escape of a comparatively small amount of blood from the carotid artery than by the withdrawal of a much larger quantity from the femoral.

FIBRO-MUCOUS POLYPI OF THE NASO-PHARYNX.

These tumours vary in size from a pigeon's to a hen's egg, and are generally smooth, dark red, and more or less ovoid in form. Though certainly rare, they are more common than true fibromata in this situation. I have notes of only seven cases, though I have seen two or three others. The *symptoms* to which they give rise are principally those proceeding from nasal obstruction, but occasionally they cause deafness. They do not lead to hæmorrhage, nor do they tend to destroy the bones with which they come in contact: and these points will serve to establish a *diagnosis* between such growths and true fibromata.

The *pathology* of these tumours has been rendered interesting by the researches of Panas,[1] who has shown that the mucous membrane round the posterior nares, and in the immediate neighbourhood of these orifices, presents a kind of transitional form between the mucous membrane of the nasal fossæ, and the dense closely adherent fibro-mucous lining of the pharyngeal vault. Growths in these situations are composed, to a great extent, of the structural elements of the tissue from which they originate, and whilst a polypus springing from the pituitary membrane may be expected to be of mucous texture, one from the under surface of the basilar process is likely to be fibrous, and a tumour taking origin from the membrane round the posterior nares, where the fibrous and mucous elements are mingled, will probably present a corresponding fibro-mucous structure. This observation, however, must not be interpreted as being the statement of an absolute law, for as has been already seen, polypi of purely fibrous structure may be found within the nasal fossæ, and, on the other hand, growths of genuinely fibro-mucous character have been seen arising from near the roof of the pharynx. In those cases in which the tumour has branches extending both into the pharynx and into the nasal fossæ, the pharyngeal part is, as a rule, altogether fibrous, whilst the nasal offshoot is mucous in character. Panas[2] himself, who had been led by his anatomical investigations to conjecture that such mingled forms of polypi would be found in the naso-pharynx, met with an example in 1865. The patient was a man, aged sixty-eight, who had suffered from obstruction in the left nostril for three years. On examination by anterior rhinoscopy only a small reddish protuberance could be seen far back in the cavity, but on looking into the mouth, the soft palate was seen to be pushed down by a tumour of whitish appearance. This was found to be extremely hard to the touch, and to be distinctly pedunculated. Panas divided the velum, and removed the polypus with scissors, having previously twisted the pedicle to prevent hæmorrhage. The growth was round, smooth, and of fibrous appearance, both externally and on section, except the part that had blocked up the nostril, which was mucous in structure. In another instance recorded by Panas[1] the patient was a woman, aged twenty-six, who had suffered from obstruction of both nostrils for two years. Nothing could be seen by anterior rhinoscopy, but with the finger passed up behind the soft palate, a somewhat hard, pedunculated, and movable tumour was found hanging from the posterior nares into the pharynx. This mass was removed in the same manner as in the previous case, and it was found to consist of two polypi, each attached by a pedicle to the posterior edge of the vomer. Each tumour closed one posterior orifice like a lid, and part of the larger one of the two rested on the soft palate. They were reddish in colour, in density intermediate between a fibrous tumour and a myxoma, and on section a certain quantity of serosity escaped. In addition to these, Mathieu[2] has collected four cases belonging to Legouest, Bonnes, Duménil, and Trélat, in which growths originating from the base of the skull were apparently of a fibro-mucous character, but in only one of these instances was the structure accurately determined by microscopic examination. In two other cases[3] (viz., those of Trélat and Labbé), where the growths originated from the upper part of the posterior nares, careful examinations by Cornil and Coyne proved that the polypi were of truly fibro-mucous character.

---

[1] "Bull. de la Soc. de Chir." 1873. The original statement, according to the author, was made in 1858, but he gives no reference.

[2] Ibid, p. 378, et seq.

The *prognosis* is very favourable, as fibro-mucous polypi show but little tendency to recurrence after removal. The *treatment* should be to extirpate the polypus by the most suitable operation that offers itself. I have generally effected a cure by evulsion with forceps introduced through the mouth, as that is the readiest and most efficient method; but in some cases a wire can be passed through the nose round the pedicle, and in others the tumour can be attacked in the naso-pharynx by electric cautery. For this purpose Lincoln's post-nasal electrode (Fig. 61, p. 273) will be found very useful. Of the seven cases that I have met with, I succeeded in curing five; in one instance the disease recurred, but I heard that the patient was afterwards cured by another practitioner. The seventh case was lost sight of, and its ultimate result is unknown to me. Severe "preliminary operations," such as are usually necessary for the removal of fibrous polypus of the naso-pharynx, are never required in the case of the growths now under consideration.

---

[1] Ibid.

[2] "Sur les Polypes muqueux des Arrière-narines." Thèse de Paris, 1875.

[3] Ibid.

ENCHONDROMA OF THE NASO-PHARYNX.

A case of true cartilaginous growth springing from the basilar process of the occipital bone has been reported by Max Müller.[1] From the history of the case it appears that the patient, a man aged twenty-four, had noticed some obstruction in his nose five or six years before he came under observation. As the malady progressed he began to suffer from excruciating pain, together with frequent drowsiness, and occasional loss of consciousness. The growth increased in size, pressing the soft palate downwards, completely filling both nostrils and displacing the nasal septum. The pressure of the mass produced absorption of the *lamina papyracea* of the ethmoid, and the tumour extended into the orbit. Müller removed the growth with a wire loop, having first performed temporary resection of the nose according to Langenbeck's method. The tumour, which was found to be attached to the basilar process, was of the size of a man's fist, and weighed about four ounces. It was proved by microscopic examination to be of truly enchondromatous nature.

This is the only instance, so far as I am aware, in which a cartilaginous growth is stated to have originated within the naso-pharyngeal cavity. Two cases, however, are on record in which a tumour primarily fibromatous in constitution is said to have become wholly or in part transformed into cartilage. In one of these the patient was a boy, aged twelve, who died whilst under the care of Samuel Cooper.[1] The face was shockingly disfigured, the nose being bulged out on the left side to an extreme degree, and the eyes being four inches apart. The pharynx was so filled with the tumour that feeding even with the help of a spoon was most difficult, and it was impossible to examine the hard palate. The left eye had been completely blind for some time; and a week or two before the patient's death paralysis of the legs and bladder came on. At the autopsy "a good deal of the tumour was found to be of a cartilaginous consistence." A piece almost as large as an orange had penetrated the skull and destroyed the anterior lobe of the left hemisphere of the brain. All the neighbouring bony structures had been more or less absorbed, so that it was impossible to discover the point of origin of the tumour. A most remarkable feature in this case is that, in spite of such extensive cerebral lesions, the patient had felt no pain, and had not lost consciousness till the last moments of life. The second case is that of a boy, seventeen years of age, who had suffered for some time from the usual symptoms of naso-pharyngeal polypus. He was operated on by Le Dentu[2] according to Nélaton's palatine method, and the growth, which was found to spring from the basilar process, and presented all the naked-eye appearances of a fibroma, seemed to be completely destroyed. Recurrence, however, took place within a twelvemonth, and Le Dentu performed a second operation, this time gaining access to the tumour by laying the nose open from the front. In this manner he removed a *cartilaginous* growth as large as a date, which was attached to the posterior edge of the vomer, and sent branches into each nasal fossa. Behind this, and connected with it, was another *cartilaginous* mass, which seemed to be attached to the base of the skull. It was not judged safe, however, to meddle with this portion of the growth. The patient appears to have made a good recovery, but the ultimate issue of the case is not stated. With reference to the nature of the tumour in this instance, it is to be noted that no microscopic examination was made of the mass removed at the first operation. It is therefore at least possible that it may have been of enchondromatous nature from the outset. Petit[1] suggests that the transformation may have been due to irritation of the neighbouring osseous tissue. The fact, however, that no such sequence of events has been observed in similar cases makes this hypothesis somewhat difficult of acceptance.

---

[1] "Langenbeck's Archiv. f. klin. Chirurg." 1870, Bd. xii. p. 323.

---

[1] "Dict. of Practical Surgery," edited by Lane. London, 1872, Art. "Polypus," vol. ii. p. 463.

[2] Petit: "De quelques Considérations sur les Polypes naso-pharyngiens." Thèse de Paris, 1881, p. 32, et seq.

MALIGNANT TUMOURS OF THE NASO-PHARYNX.

Cases of malignant disease, in this situation, were mentioned without any details by Otto Weber,[2] and instances have since been related by Verneuil,[3] Rabitsch,[4] Gross,[5] Demarquay,[6] and Bryk,[7] whilst a short monograph on the subject has been published by Veillon.[8] The *causes* of such growths are utterly unknown, and the disease itself does not appear to be very common. The rarity of the complaint, however, is probably not so great as might be inferred from the extremely small number of recorded cases, the affection, no doubt, having in some cases been mistaken for simple fibrous polypus. In certain rare instances a growth of the latter kind may gradually become transformed into genuine sarcoma.[9]

The *symptoms* are those characteristic of all tumours which obstruct the nasal channels, viz., an annoying sense of impeded respiration, which may gradually increase to actual dyspnœa, occasional epistaxis, more or less constant coryza, post-nasal catarrh (the secretion being often extremely fetid), alteration of voice, and imperfect articulation. Great pain is a frequent, but by no means invariable accompaniment of malignant tumours in the naso-pharynx; it is often described by the patient as "shooting through the ear, and is, as a rule, most troublesome at night. As the tumour increases, dysphagia may be produced, and finally general cachexia may supervene. Anterior rhinoscopy will probably show that there is an obstructing mass in one or both of the nasal channels, and a careful use of the probe will enable the surgeon to ascertain whether this substance is attached to the septum or any other part of the fossa. On looking into the mouth the velum will probably be seen to be dense, and perhaps bulged forwards at one part; if the tumour is of considerable size part of it may be visible on drawing aside or raising the soft palate. Sarcomatous tumours of the naso-pharynx are not unfrequently pedunculated and somewhat pyriform in shape, whilst occasionally they are more or less distinctly lobulated. They are covered by the mucous membrane of the pharynx, and present no special features by which the eye or the touch can detect their true nature. These tumours have the usual characteristics of malignancy, viz., rapidity of growth, recurrence after removal, and in many cases a disposition to form secondary deposits in other organs. The *diagnosis* can seldom be made with certainty except by microscopic examination. A very practised and delicate sense of touch might possibly enable the surgeon to distinguish the moderate density of a sarcoma from the extreme hardness of a true fibroma. Tactile investigation, however, is a most untrustworthy guide in such cases, as it has to be exercised under difficult conditions, and, moreover, the structure of tumours in the naso-pharyngeal region is seldom uniform throughout their whole mass, both fibrous and sarcomatous growths having frequently a certain admixture of mucous tissue. The *prognosis* in cases of malignant growths of the naso-pharynx is altogether hopeless. As regards the *pathology* of such tumours, they appear to be mostly of sarcomatous nature. They often, however, present a considerable amount of mucous or fibrous tissues, in addition to the characteristic round or spindle-shaped cells; and it is possible that in such cases the malignant growth may have supervened on what was originally a mere hyperplasia. Sometimes, as in cases recently reported by Thornley Stoker[1] and McDonnell,[2] cartilage-cells are contained in the tumour. If the disease be met with in an early stage the *treatment* should consist in the entire removal of the mass with the snare or electric cautery. In most cases a "preliminary operation" (p. 520) will be necessary to expose the tumour. The surgeon should carefully watch for any signs of recurrence, in order that he may at once attack the disease again, if necessary; but the best that can be done is often merely to prolong a miserable existence.

---

[1] Op. cit. p. 34.

[2] Pitha u. Billroth: "Chirurgie." Bd. iii. 1 Abtheil. 2. Heft. Erlangen. 1866.

[3] "Bull. de la Soc. de Biologie." Paris. 1869.

[4] "Allgem. Wien. med. Zeitung." 1869. No. 42.

[5] "Gazette Méd. de Strasbourg." 1872. No. 2.

[6] "Bull. de la Soc. de Chir." June 18, 1873.

[7] "Arch. f. klin. Chirurg." Bd. xvii. 4 Heft. p. 562.

[8] "Contribution à l'Etude des Tumeurs malignes naso-pharyngiennes." Thèse de Paris, 1875.

[9] Otto Weber: Op. cit. p. 207. See particularly Fig. 37 (ibid.), which is a representation of a naso-pharyngeal fibrous polypus that had undergone sarcomatous degeneration.

---

[1] "Brit. Med. Journ." Jan. 19, 1884, p. 113.

[2] Ibid.

THROAT-DEAFNESS.

Definition.—*Deafness caused by morbid conditions in the naso-pharynx near the orifice of the Eustachian tube, or by changes in the walls of the tube itself, which interfere with the free passage of air to the tympanic cavity.*

History.—Many of the older writers have mentioned that deafness may be caused by mechanical obstruction of the pharyngeal orifice of the Eustachian tube, or inflammation of its interior, resulting from syphilitic disease. Thus Valsalva[1] speaks of deafness arising from obliteration of the tube by ulceration of specific origin. Van Swieten[2] describes the extension of venereal ulceration from the pharynx along the Eustachian tube to the internal ear, and Plenck[3] mentions stricture of the tube dependent on the same cause. Similar observations were made by Nisbet,[4] B. Bell,[5] Swiedaur,[6] Saunders,[7] and Cullerier.[8] The actual term "throat-deafness" was first employed in comparatively recent times, and was applied to a form of deafness which was supposed to be due to enlargement of the tonsils. This view was strongly insisted on by Yearsley[9] in 1853, but was successfully combated by Harvey,[10] who showed on anatomical grounds that it is impossible for the Eustachian orifice to be blocked up in this way, and suggested that the affection might be due to an extension of the inflammation of the mucous membrane covering the tonsils to the contiguous lining of the Eustachian tube. This theory soon gained general acceptance, and nearly all cases of throat deafness were looked upon as examples of catarrh of the middle ear, originating in the naso-pharyngeal region. From the more accurate knowledge gained in late years, however, throat-deafness has come to be attributed to various other diseased conditions of the Eustachian tube. In 1862

---

[1] "De aure humanâ." Bologna, 1704, p. 90.

[2] "Comment. in H. Boerhaave Aphorismos." Lugd. Batav. 1772, t. v. pp. 369, 371, 373.

[3] "De morbi venerei doctrinâ." Viennæ, 1779, p. 89.

[4] "First Lines of the Theory and Practice of Venereal Disease." Edinburgh, 1787, p. 330.

[5] "Treatise on Gonorrhœa." Edinburgh, 1793, vol. ii. p. 65, et seq.

[6] "Traité de la Maladie vénérienne." Paris, 1801, t. ii. p. 144.

[7] "Anatomy of the Human Ear, &c." London, 1806, p. 79.

[8] "Journ. de Médecine." 1814, t. xlix. p. 202.

[9] "Throat-Deafness." London, 1853, 1st ed. p. 2, et seq.

[10] "The Ear and its Diseases." London, 1856, p. 157.

Hinton[1] distinguished two forms of throat-deafness, one dependent on inflammatory thickening of the palato-pharyngeal region, the other on *relaxation* of those parts. The recognition of the importance of adenoid growths in the naso-pharynx as a frequent cause of deafness by Meyer[2] in 1869, marks an epoch in the history of throat-deafness. In 1873 a most important work was published by Weber-Liel,[3] who brought forward a considerable amount of evidence to show that what had hitherto been looked upon as a catarrhal affection of the Eustachian tube and middle ear was in fact a neurosis, the chief feature of the complaint being paralysis of the tensor palati—the muscle mainly concerned in maintaining the patency of the Eustachian canal. According to Weber-Liel the paralysis of this important muscle leaves the tensor tympani unbalanced, a condition producing many evils, which will presently be referred to. In 1879 Woakes[4] described, at the annual meeting of the British Medical Association, a form of throat-deafness in which both the tubal muscles and the tensor tympani are paralysed.

[1] "Holmes's System of Surgery." London, 1862, 1st ed. vol. iii. pp. 159—162.
[2] "Med.-Chir. Trans." 1870, vol. liii. p. 192, et seq.
[3] "Ueber das Wesen u. die Heilbarkeit der häufigsten Form progressiver Schwerhörigkeit." Berlin, 1873.
[4] "Brit. Med. Journ." 1879, vol. ii. pp. 328, 329.

Etiology.—The disease may depend on a paretic condition of the Eustachian tube, on chronic inflammatory thickening of its lining membrane, or on any morbid state of the naso-pharynx which gives rise to obstruction of the Eustachian orifice. These three factors in the production of throat-deafness will now be considered in detail.

In the nervo-muscular cases the immediate cause of the affection seems to be paralysis of the tensor palati, a lesion which, according to Weber-Liel, may be either central, reflex, or vaso-motor in its origin. The impaired contractility of the tube most frequently results from morbid conditions of the fifth nerve, but in like manner, neuroses of the facial, glosso-pharyngeal, vagus, and spinal accessory, and of the sympathetic plexuses in the naso-pharynx and neck may lead to atrophy and fatty or fibrous degeneration of the muscles. The remote causes of these nervous affections are usually mental strain, depressing emotions, excessive exertion, parturition, and, speaking generally, all unhealthy modes of life. Weber-Liel's work contains examples of throat-deafness following phthisis and typhoid fever. Diphtheritic affections of the naso-pharynx would, of course, be likely to lead to disease of the Eustachian tube and middle ear, and that this complication is not uncommon may be inferred from the fact that Wendt[1] found the middle ear involved in two-fifths of the cases in which there was false membrane in the naso-pharynx. Rheumatism, progressive muscular atrophy, chlorosis, and even extreme anæmia may likewise impair the muscles. Weber-Liel is of opinion that paresis is sometimes favoured by congenital defect in the development of these muscles.

---

[1] "Ziemssen's Cyclopædia," vol. vii. p. 71.

Chronic inflammation of the Eustachian tube sometimes follows catarrh of the naso-pharynx, but it must not be forgotten that catarrh is extremely likely to occur in parts whose innervation is impaired, and that in many cases of catarrhal affection of the middle ear, the neurosis has been the starting-point. According to Zaufal,[1] however, dry catarrh frequently brings on deafness by extension of the unhealthy condition to the Eustachian tube. He states that he found this complication in as many as 80 per cent. of the cases of ozæna which he had examined. I have not myself met with deafness in patients suffering from ozæna in anything like the same proportion, though I have occasionally found the two conditions coexistent.

The disease of the naso-pharynx which most frequently interferes with the Eustachian orifice is the presence of adenoid growths in that region. Among 175 patients suffering from these vegetations in the naso-pharynx, Meyer[2] found associated defect of hearing in 130. Syphilitic lesions may also occur in the neighbourhood of the Eustachian tube, and lead to impairment of hearing by mechanical obstruction or inflammation of the canal. This, as already remarked, was noticed by several of the older writers. In recent years Zaufal[3] has called attention to the frequent occurrence of gummata in the immediate neighbourhood of the Eustachian tube. Among more obscure forms of throat-deafness may be mentioned phlebectasis of the mucous membrane covering the Eustachian cartilage, which, according to von Tröltsch,[4] may narrow the lumen of the tube to a degree sufficient to diminish the power of hearing. Zuckerkandl[5] states that the veins of the internal pterygoid plexus may, if enlarged, produce the same effect by their pressure on the Eustachian cushion. Schwartze[6] asserts that œdema of the tubal prominences, and consequent partial occlusion of the Eustachian tube, may be caused by obstruction to the blood-current in the superior *vena cava.* The Eustachian canal is, in certain instances, blocked up by exostoses situated in the vicinity of the tube; von Tröltsch[1] found this condition produced in one case by hypertrophy of the posterior extremity of the inferior spongy bone, and in another by a bony outgrowth from the septum.

---

[1] "Die allgemeine Verwendbarkeit der kalten Drahtschlinge." Prag. 1878.

[2] "Archiv. für Ohrenheilkunde. 1874, Bd. viii. p. 243.

[3] Loc. cit.

[4] "Lehrbuch der Ohrenheilkunde." 1877, p. 310.

[5] "Monatsschrift f. Ohrenheilkunde." Jahrgang x. Sp. 52, p. 231.

[6] "Pathol. Anatomie des Ohres." p. 104.

Symptoms.—Throat-deafness being dependent on so many different conditions, the symptoms vary considerably. The phenomena even in paretic cases differ greatly, one set giving rise to distressing symptoms, and tending to get worse in spite of all treatment, whilst the other causes much less inconvenience, and generally yields to remedial measures. The first class is that described by Weber-Liel. One of the earliest signs is *fatigue* in listening. It shows itself by the patient perceiving a difficulty in hearing, after a prolonged conversation, the auditory power being good at the commencement, but gradually failing as the strain continues. The patient finds it particularly difficult to hear when general conversation is going on, though he can do so with ease when one person is speaking alone. The difficulty in the former case arises from a loss of the "power of accommodation," the tympanum being unable to adapt itself readily to the different sounds caused by voices of varying quality and intensity, proceeding from persons situated at different distances and in different directions in relation to the listener. Together with this, noises are frequently perceived in the affected ear, whilst snapping sounds are heard by the patient in chewing and swallowing. As the disease advances, giddiness is sometimes felt. The patient often complains of an uneasy tickling or scratching sensation in the throat, and on inspection, paralysis of one or both sides of the pharynx may be noticed. Though Weber-Liel[2] first called attention to this paralysis, Woakes has rendered good service in insisting on the great importance of carefully examining the soft palate in every case of deafness in order to ascertain whether its innervation is normal. This examination is of the utmost importance in the cases here described, as the neurosis does not of itself attract notice, the paresis being seldom sufficiently severe to modify the patient's voice by giving it the peculiar intonation so characteristic of paralysis of the soft palate. On examining the ear the tympanum is often seen to be retracted, and sometimes opaque and thickened. Owing to the collapse of its walls the Eustachian tube cannot be inflated with Politzer's bag, but the catheter can be passed with ease.

---

[1] "Archiv. für Ohrenheilkunde." Bd. iv. p. 140.

[2] Op. cit. pp. 33—36.

The affection just described most frequently begins on the left side, and it shows great intractability. According to Weber-Liel the troublesome character of the symptoms is largely due to the unbalanced action of the tensor tympani, causing an intense strain on the drumhead and the ossicles. A much milder neurosis has been described by Woakes, in which, however, the innervation, both of the tubal muscles and the tensor tympani, is impaired. The obstruction of the Eustachian tube is only partial, for the two sets of muscles being alike affected, they balance each other exactly, and on examining the ear, the drumhead is seen to be normal or only slightly flattened. In these cases noises in the head and giddiness are not perceived, but the deafness is marked from the very commencement of the affection, which, however, shows a tendency to recovery.

Throat-deafness dependent on any of the morbid conditions of the naso-pharynx already described, presents the symptoms of those affections with the addition of deafness.

Diagnosis.—A careful examination of the palate, the naso-pharynx, and the auditory canal will serve to determine whether the disease is Eustachian in its origin. The state of tension of the membrana tympani will enable the practitioner to discriminate between the different kinds of paresis, and it must not be forgotten that in the severer form structural disease of the middle ear is very apt to be set up.

Pathology.—The pathology of the various affections of the naso-pharynx, which may accidentally lead to obstruction of the Eustachian orifice, has been considered in its appropriate place, and it now only remains to make a few remarks on the paretic forms of throat-deafness. In the severer cases, through collapse of the tube the air in the tympanic cavity becomes unduly rarefied, whilst the tensor tympani being no longer balanced, tension of the tympanic membrane takes place, the chain of ossicles is put on the stretch, and the stapes is pressed into the labyrinth. Secondary changes soon follow: passive congestion of the tympanic cavity leads to trophic changes of a more or less cirrhotic character, consisting at first in the growth and afterwards in the atrophy of a low form of connective tissue. Adhesion takes place between parts normally separate, the stapes becomes fixed in the fenestra ovalis, and the labyrinth becomes the seat of disease. As already remarked, Weber-Liel thinks that the starting-point of these serious changes may be either central, reflex, or vaso-motor. The less severe complaint described by Woakes is, according to that physician, always of vaso-motor origin. He believes that in such cases the nerve force, especially of the sympathetic system, is exhausted.

Prognosis.—In the nervous cases the age and condition of the patient must be taken into account. If the subject of the affection be a person worn out by disease, overwork, or anxiety the prognosis is very unfavourable. The tendency towards permanent loss of hearing is indeed so marked in this class of cases that Weber-Liel, who first described them, calls the affection "*progressive deafness.*" The presence of tinnitus must also always be a matter of serious import.

When the disease is due to adenoid growths a favourable prognosis may be given, as the vegetations can always be got rid of. In other cases of a mechanical nature the prospects of the patient must depend on the possibility of removing the cause of the obstruction.

Treatment.—The nervous cases should be treated in the early stage by inflation of the Eustachian tube by Politzer's method, if the tube responds to that treatment, and if not, by means of the catheter. Intra-tubal galvanism has been found useful by Weber-Liel in the commencement of the more severe type of the disease, and Woakes asserts that it is of very great service in the slighter cases. Von Tröltsch[1] maintains that the act of gargling, by exercising the palato-pharyngeal muscles, is often beneficial. In the later period of the disease, when secondary changes have taken place in the middle ear, nothing remains but the doubtful operation of paracentesis of the tympanum and tenotomy of the tensor tympani. Long before the complaint has reached this stage, however, constitutional treatment should have been carried out. The patient ought, if possible, to be relieved from worry and anxiety; if overworked he should diminish his labours or desist from them altogether and seek change of scene, whilst his system should be invigorated in every possible way. Nerve-tonics, especially phosphorus and strychnia, are useful in some cases, whilst for the anæmic, preparations of iron are more beneficial.

---

[1] "Archiv. f. Ohrenheilkunde," Bd. iv. p. 140.

Where the disease depends on actual obstruction the cause must, if possible, be removed. Adenoid growths must be got rid of in the manner already indicated (p. 502, et seq.). Syphilitic webs and enlarged veins should, if possible, be destroyed with the electric cautery, œdematous swellings must be scarified, and exostoses, if they can be reached, should be broken off with curved forceps.

APPENDIX.

SPECIAL FORMULÆ FOR TOPICAL REMEDIES,

MOST OF WHICH ARE CONTAINED IN THE THROAT HOSPITAL PHARMACOPŒIA.

Those Formulæ which are printed in black (Egyptian) type have been found of especial use by the Author.

FORMULÆ FOR INHALATIONS HAVE ALREADY BEEN GIVEN (VOL. I., pp. 573—576), AND FOR LOZENGES (*Ibid.* p. 578).

BUGINARIA.

MEDICATED bougies are useful in chronic affections of the nasal passages. The indications for the employment of the different kinds of buginaria will be gathered from their constitution. The basis of the bougie is "gelato-glycerine," which consists of gelatine, glycerine, and water, in the following proportions:—

R. Refined Gelatine (by weight) ℥v.
Glycerine ,, ℥vj.
Water ,, ℥vj.

Soak the gelatine in the water for twelve hours, with occasional stirring, add the glycerine, dissolve in a water-bath, and evaporate to produce fifteen ounces by weight of the gelato-glycerine. In making bougies the gelato-glycerine must be melted, the medicament added, and the substance poured into moulds of such a shape that each bougie has a length of eight centimetres, and is of a tapering form (Fig. 93), the diameter of the larger end being eight millimetres, and that of the smaller extremity three millimetres. The annexed wood-cut shows the shape of the bougie as it is made in the mould.

FIG. 93.—THE NASAL MEDICATED BOUGIE.

When required for use it can, of course, be shortened or pared down if desired. The following may be taken as a typical formula:—

℞. Iodoform, in fine powder, gr. ss.
Glycerine, ♏j.

Rub together, and add the mixture to

Gelato-glycerine, melted in a water-bath, gr. xl.

Mix and pour into the mould. When solidified, remove for use.

Buginarium Acidi Carbolici (Acid. Carbol. gr. ss., Gelato-Glycerini, gr. xl.).
,, Bismuthi (Bismuth. Subnitrat. gr. v., Glycerini ♏iij., Gelato-Glycerini gr. xl.).
,, Cupri Sulphatis (Cupri Sulph. Pulverisati gr. $\frac{1}{10}$, Gelato-Glycerini gr. xl.).
,, Iodoformi (Iodoformi Pulverisati gr. ss., Glycerini ♏j., Gelato-Glycerini gr. xl.).
,, Morphiæ (Morph. Acetat. gr. $\frac{1}{10}$, Gelato-Glycerini gr. xl.).
,, Plumbi Acetatis (Plumbi Acetat. gr. ss., Glycerini ℥ij., Gelato-Glycerini gr. xl.).
,, Thymolis (Thymol. gr. $\frac{1}{10}$, Sp. Vin. Rect. ♏ss., Gelato-Glycerini gr. xl.).
,, Zinci Sulphatis (Zinc. Sulph. Pulverisati gr. $\frac{1}{10}$, Gelato-Glycerini gr. xl.).

COLLUNARIA—NASAL DOUCHES.

Not more than twenty ounces of fluid should ever be used for a nasal douche, and ten ounces are generally sufficient. If an apparatus on the syphon principle be employed, it should be placed just above the level of the patient's head, in order to avoid too great force of current.

The temperature of the fluid should be about 90° Fahr.

Astringent.

Collunarium Acidi Tannici (Acid. Tannic. gr. iij., ad ℥j.).
,, Aluminis (Aluminis gr. iv., ad ℥j.).
,, Zinci Sulphatis (Zinc. Sulph. gr. ss., ad ℥j.).

Detergent.

,, Acidi Carbolici cum Sodâ et Borace (Acid. Carbol. gr. iv., Sodæ Bicarb. gr. xij., Boracis gr. xij., Aquæ ℥j.).
,, Potassæ Permanganatis (Sol. Potass. Permang., B.P., ♏vj., Aquam ad ℥j.).
,, Sodæ (Sodæ Bicarb. gr. xxx., ad ℥j.).
,, Sodii Chloridi (Sodii Chloridi, gr. xx., ad ℥j.).

Antiseptic.

,, Acidi Carbolici (Acid. Carbol. Puri gr. iij., Glycerini ♏xx., Aquam ad ℥j.).
,, Zinci Sulpho-Carbolatis (Zinc. Sulpho-Carbol. gr. ij. ad ℥j.).

LOTIONES—NASAL WASHES.

These lotions should be sniffed up into the nose from the hollow of the hand, or gently injected by means of a small glass or india-rubber syringe. The fluid should be made to traverse the whole length of the nasal fossæ till it trickles into the pharynx, when it must be spit out. The lotions should be used at a temperature of about 100° Fahr.

Detergent.

Lotio Alkalina (Sodæ Bicarb. gr. xij., Acid. Carbol. gr. iss., Aquæ ℥j.).
,, Ammonii Chloridi Alkalina (Sodæ Bicarb. gr. vj., Ammon. Chlorid. gr. vj., Aquæ ℥j.).
,, Potassæ Chloratis Alkalina (Sodæ Bicarb. gr. vj., Potass. Chlor. gr. vj., Aquæ ℥j.).

Lotio Alkalina Composita (Sodæ Bicarb., Sodæ Biborat., Sodii Chlorid. āā. gr. vij., Sacch. Alb. gr. xv.).

The powder thus formed should be dissolved in about half a tumblerful of tepid water.[1]

Astringent.

,, Aluminis (Alum. gr. vj. or more, Acid. Carbol. gr. iss., Aquæ ℥j.).

,, Ammonii Chloridi Astringens (Ammon. Chloridi gr. vj., Aluminis gr. vj., Aquæ ℥j.).

,, Zinci Sulphatis (Zinc. Sulph. gr. vj., Acid. Carbol. gr. iss., Aquæ ℥j.).

NEBULÆ—NASAL SPRAYS.

In using these the ordinary hand-ball spray-producer answers well. Besides a long tapering straight nozzle for the anterior part of the nasal fossæ, another, curved upwards almost at a right angle about an inch and a half from the point, will be required for the posterior nares.

Antiseptic.

Nebula Acidi Carbolici (Acid. Carbol. gr. iij., ad ℥j.).

,, Acidi Sulphurosi (Acidi Sulphurosi q.s.).

Forty to sixty drops should be used at a time. The spray should be inhaled very slowly.

,, Iodi cum Acido Tannico (Tr. Iodi ♏iij., Glycerini Acid. Tann. ♏xij., Aquam Destill. ad ℥j.).

,, Iodoformi (Iodoform. gr. xl., Ætheris. Sp. Gr. ·735, ℥j.).

,, Potassæ Permanganatis (Potass. Permang. gr. v., Aquæ Destill. ℥j.).

,, Sodæ Benzoatis (Sodæ Benzoat. gr. xx., Aquæ Destill. ℥j.).

,, Zinci Iodati (Iodated Zinc Caustic ♏ij. or more, Aquam Destill. ad ℥j.).

Astringent.

,, Acidi Tannici (Acid. Tannic. gr. v., Aquæ Destill. ℥j.).

---

[1] The author has constantly prescribed this lotion during the last few years for chronic inflammatory conditions of the nares and naso-pharynx, and with very satisfactory results.

Nebula Aluminis (Liq. Alumin. Chlorid. ♏iij., Aquam Destill. ad ℥j.).
,, Aluminis (Alum. gr. viij., Aquæ Destill. ℥j.).
,, Ferro-Aluminis (Ferro-Alum. gr. iij., Aquæ Destill. ℥j.).
,, Ferri Perchloridi (Ferr. Perchlor. gr. iij., Aquæ Destill. ℥j.).
,, Ferri Sulphatis (Ferr. Sulphat. gr. ij., Aquæ Destill. ℥j.).
,, Zinci Chloridi (Zinc. Chlorid. gr. ij., Aquæ Destill. ℥j.).
,, Zinci Sulphatis (Zinc. Sulph. gr. v., Aquæ Destill. ℥j.).

Detergent.

,, **Alkalina (Sodæ Bicarb. gr. xv., Boracis gr. xv., Acid. Carbol. gr. iv., Glycerini ♏xlv., Aquam ad ℥j.).**

And the following, which is alluded to in the body of the work as "Dobell's Solution."[1]

℞. Boracis, ʒj.
Glycerini Acidi Carbolici, ʒij.
Sodæ Bicarbonatis, ʒj.
Aquæ, Oss.[2]

Nebula Potassæ Chloratis (Potass. Chlor. gr. xx., Aquæ ℥j.).
,, Sodii Chloridi (Sodii Chlorid. gr. v., Aquæ destill. ℥j.).

Sedative.

,, Potassii Bromidi (Potass. Bromidi gr. xx. ad ℥j.).

Useful in Diphtheria.

,, Acidi Lactici (Acid. Lactic., U.S.P., ♏xxx., Aquam Destill. ad ℥j.).
,, Calcis (Aq. Calcis q.s.).
,, Sodæ Salicylatis (Sodæ Salicylatis gr. xx., Aquæ ℥j.).

---

[1] "Winter Cough." London, 1875, 3rd ed. p. 211.

[2] The water should be warm. Chloride of ammonium, chlorate of potash, or Condy's fluid may be substituted for the borax in the above formula.

GOSSYPIA MEDICATA—MEDICATED COTTON WOOLS.

Nasal plugs of unmedicated cotton-wool have been used for some time by Gottstein in cases of simple ozæna with the happiest results. A full description of his method of applying them has already been given in the body of the work (p. 282 and p. 336). In cases of active inflammation or syphilitic ulceration affecting the interior of the nose or the naso-pharyngeal region, medicated wools, as proposed by Dr. Woakes, answer best, the remedy being by this means brought into direct and constant contact with the diseased part. The ingredients are first mixed together and dissolved, the wool is then to be saturated evenly with the solution and dried by exposure to the air with a moderate heat.

Astringent.

Gossypium Acidi Tannici (Acid. Tannici gr. xxx., Glycerini ♏x., Aquæ ʒvj., Cotton Wool, in a thin sheet, gr. lx.).

" Aluminis (Alum. gr. xxx., Glycerini ♏x., Aquæ ℥j., Cotton Wool as above).

" Ferri Perchloridi (Liq. Ferr. Perchlor. ℥ss., Glycerini ♏x., Cotton Wool as above).

" Cubebæ (Tr. Cubebæ ℥j., Glycerini ♏x., Cotton Wool as above).

" **Hamamelis (Tr. Hamamel. ℥ss., Glycerini ♏x., Cotton Wool as above).**

" Krameriæ (Tr. Krameriæ ℥ss., Glycerini ♏x., Cotton Wool as before).

Antiseptic and Disinfectant.

" **Acidi Boracici (Acidi Boracici gr. lx., Glycerini ♏xx., Aquæ ℥vj., Cotton Wool as above).**

" Camphoræ (Camphoræ gr. xxx., Æther. Pur. ℥j., Cotton Wool as above).

N.B.—This wool should be prepared in a room where there is neither artificial light nor fire.

" Iodi (Tr. Iodi ℥ss., Glycerini ♏x., Cotton Wool as before).

Gossypium Iodoformi (Iodoformi gr. lxx., Æther. Pur. fl. ʒx., Alcoholis fl. ʒij., Glycerini ♏x., Cotton Wool as before).

N.B.—This wool should be prepared in a room where there is neither artificial light nor fire.

Sedative.

,, Opii (Tr. Opii ʒss., Glycerini ♏x., Cotton Wool as above).

OLFACTORIA—OLFACTORIES.

These are dry inhalations of the nature of smelling-salts, and should be used in the same way, *i.e.*, a little cotton-wool or sponge should be saturated with the medicament and placed in a stoppered glass bottle. The remedy is to be sniffed up the nose.

The following is very popular in Germany, and has been alluded to in the body of the work (p. 291) as the Hager-Brand's "Anti-catarrhal Remedy."

R. Acid Carbolici
Liq. Ammon. Fort. āā ʒv.
Alcoholis, ʒij.

To be kept in a dark place or in a tinted glass bottle.

PASTILS.

This is a soft variety of lozenge, somewhat resembling in appearance and consistence the "jujubes" sold by confectioners. The basis of the preparation is glyco-gelatine, a compound much employed in the manufacture of pessaries and soluble bougies. Its adaptation to the present purpose was advocated by Dr. Whistler ("Med. Times and Gaz," Nov., 1878) as a means of applying iodoform to the throat, and as affording a ready method of prescribing lozenges to meet the requirements of individual cases. Pastils are especially suited to cases of inflammation of the tongue or palate, and their mucilaginous nature gives much relief in dryness of the throat. Their soft consistence renders them particularly useful in cases of œsophageal disease.

No substances, such as tannin, rhatany, or kino, which are chemically incompatible with gelatine, can be employed with the basis.

The following is the formula for the glyco-gelatine :—

℞. Refined Gelatine ℥j.
Glycerine (by weight) ℥iiss.
Ammoniacal Solution of Carmine q.s.
Orange-flower Water ℥iiss.

The process to be pursued in making the basis is as follows :—Soak the gelatine in the water for two hours, then heat in a water-bath till dissolved; add the glycerine, and stir well together. Let the mixture cool, and when it is nearly cold add the carmine solution; mix till uniformly coloured, and set aside to solidify. After medicating, as directed in the following formulæ, it is cooled by pouring into an oiled tray, and when solidified, cut into the required number of pastils. One ounce of the mass will make twenty-four.

The following is a typical formula, iodoform being taken as an example :—

℞. Iodoform, in fine powder, gr. j.
Glycerine ♏j.

Rub together and add the mixture to the
Glyco-gelatine (melted in a water-bath), gr. xviij.
Mix and set aside to cool, and make one pastil.

Antiseptic.

Pastillus Acidi Boracici (Boracic Acid, in fine powder, gr. ij.)
,, Acidi Carbolici (Carbolic Acid, gr. ss.)
,, **Iodoformi (Iodoform in fine powder gr. j., or more or less if prescribed).**

Stimulant.

,, Ammonii Chloridi (Chloride of Ammonium gr. ij.)
,, **Bismuthi (Carbonate of Bismuth gr. iij.).**
,, Bismuthi et Potassæ Chloratis (Carbonate of Bismuth gr. iij., Chlorate of Potash gr. ij.).

Sedative.

,, Bismuthi et Morphiæ (Carbonate of Bismuth gr. iij., Acetate of Morphia gr. $\frac{1}{40}$).

INSUFFLATIONES.

(See also "Snuffs.")

The general composition of powders for this purpose has already been described (*see* Vol. i. p. 580). Most of those which are there mentioned are also available for the nasal passages and the naso-pharynx. The following are a few additional formulæ which I have found very useful. Where a vehicle is required for the medicinal agent, I generally prefer dried maize starch. Powdered myrrh and phosphate of lime are also occasionally serviceable in order to give bulk to the powder. The indications for use are clearly shown by the nature of the remedy. Two or more may sometimes be advantageously combined together, *e.g.*, a little acetate of morphia or bismuth may be added to catechu or eucalyptus if these powders are found too irritating.

Insufflatio Bismuthi Oxychloridi (gr. $\frac{1}{4}$—$\frac{1}{2}$).[1]

" Aluminis Exsiccati (gr. ss.—j.).

" **Catechu Pallidi Pulverisati** (gr. $\frac{1}{8}$—$\frac{1}{2}$).

" **Gummi Rubri** (one part to two of dried maize starch).

" Ferri Persulphatis (one part to three of dried maize starch).

" Ferro-Aluminis (with an equal quantity of dried maize starch).

" **Iodoformi** (gr. $\frac{1}{4}$—$\frac{1}{2}$, with an equal quantity of dried maize starch).

SNUFFS.

(See also "Insufflationes.")

These are chiefly useful for checking catarrh in its initial stage. They should be taken frequently, but not for more than forty-eight hours continuously.

R. Morphiæ Sulph. gr. ij.
Bismuth. Subcarb. ℥j.
M. ft. pulv.

---

[1] This is a more impalpable and less irritating preparation than either the carbonate, subnitrate, or oxide of bismuth. It is also less soluble, which renders it more adapted to produce the mechanical effect of forming a coating over inflamed or raw mucous surfaces.

The following is the formula known as "Dr. Ferrier's Snuff,"[1] or—

Pulvis Bismuthi Compositus.

℞. Morphiæ Hydrochlorat. gr. ij.
Pulv. Acaciæ ʒij.
Bismuth. Subnitrat. ʒvj.
M. ft. pulv.

One-quarter to one-half may be used in twenty-four hours.

The following snuff is recommended by Dobell[2] in chronic post-nasal catarrh :—

℞. Camphor
Tannic Acid
White Sugar
High-dried Welsh Snuff āā ʒj.
M. ft. pulv.

A pinch to be taken once in the morning and evening, and once or twice during the day. The snuff is to be discontinued if a fresh attack of nasal catarrh sets in, but should be resumed on the subsidence of inflammatory symptoms.

[1] "Lancet," 1876, vol. i. p. 525.

[2] Op. cit. p. 211.

INDEX OF SUBJECTS.

Abscess of nasal septum, 439
Abscess, periœsophageal, 56
  history, 57; etiology, 58; symptoms, 59; diagnosis, 61; pathology, 62; prognosis, 63; treatment, 63
Acids, œsophagitis from swallowing, 40
Acute œsophagitis, 26
  history, 26; etiology, 27; symptoms, 28; pathology, 29; diagnosis, 31; prognosis, 32; treatment, 32; cases of, 33
Adams's forceps for breaking down the septum, 281
Adenoid vegetations of naso-pharynx, 494
  history, 494; etiology, 495; symptoms, 497; diagnosis, 500; pathology, 501; prognosis, 502; treatment, 502
Adenoma polyposum in gullet, 102
Affections of the nose in eruptive fevers and other acute diseases, 424
Agger nasi, 233
Air-passages, chronic blennorrhœa of, 337
Alkalies, œsophagitis from swallowing, 40
Allen, Harrison, his caustic-holder, 258
American catarrh, 482
  history, 482; etiology, 483; symptoms, 489; pathology, 490; diagnosis, 490; prognosis, 491; treatment, 491
Anatomy of the gullet, 1
Anatomy of the nasal fossæ, 232
Anosmia, 461
  history, 462; etiology, 463; symptoms, 467; pathology, 467; diagnosis, 470; prognosis, 470; treatment, 471
Antimony, œsophagitis produced by, 41
Asthma, hay, 299
  history, 299; etiology, 301; (*a*) predisposing causes, 301; (*b*) exciting do., 303; symptoms, 309; diagnosis, 310; prognosis, 310; pathology, 310; treatment, 310
Auscultation of the œsophagus, 7
Auto-rhinoscopy, 254
Baber, Cresswell, his nasal speculum, 239
Bellocq's sound, 277
Bleeding from the nose, 338
  history, 338; etiology, 340; symptoms, 344; pathology, 346; diagnosis, 346; prognosis, 346; treatment, 347
Blennorrhœa, chronic, of the nose and air-passages, 337
Blood tumours of the nasal septum, 437
Bougies, œsophageal, 10
  ,, method of passing, 11
  ,, nasal, 251
Brushes, œsophageal, 17
  ,, nasal, 257
Bryant's nasal auto-insufflator, 256
Bulla ethmoidalis, 234

Calcification of œsophagus, 98
Cancer of gullet, 71
  history, 71 ; etiology, 73 ; symptoms, 78 ; pathology, 85 ; diagnosis, 90 ; prognosis, 92 ; treatment, 92 ; table of cases, 74 ; most frequent seat of, 87 ; sarcoma, 97
Cartilaginous stricture of œsophagus, 98
Catarrh, acute nasal, 283
  history, 283 ; etiology, 284 ; symptoms, 288 ; diagnosis, 289 ; prognosis, 290 ; pathology, 290 ; treatment, 290
  ,, American, *see* chronic catarrh of naso-pharynx
  ,, chronic, of naso-pharynx, 482
    history, 482 ; etiology, 483 ; symptoms, 489 ; pathology, 490 ; diagnosis, 490 ; prognosis, 491 ; treatment, 491
  ,, chronic nasal, 312
  ,, dry, 324
    history, 324 ; etiology, 326 ; symptoms, 330 ; diagnosis, 332 ; pathology, 332 ; prognosis, 335 ; treatment, 335
  ,, dry, of naso-pharynx, 492
  ,, purulent nasal, 294
  ,, summer, 299
    history, 299 ; etiology, 301 ; (*a*) predisposing causes, 301 ; (*b*) exciting do., 303; symptoms, 309; diagnosis, 310; prognosis, 310; pathology, 310; treatment, 310
Caustics, œsophagitis from swallowing, 40
Choanæ, nasal, 232
Chronic blennorrhœa of the nose and air passages, 337
Chronic catarrh of the naso-pharynx, *see* catarrh
Chronic œsophagitis, 46
Cicatricial stricture of the gullet, 129
  etiology, 130 ; symptoms, 130 ; position, 131 ; diagnosis, 132 ; pathology, 132 ; prognosis, 133 ; treatment, 134 ; gentle dilatation of, 134 ; forcible dilatation of, 135
Cohen, Solis, his post-nasal syringe, 265
Coin-catchers, 20
Compression of the gullet, 158
Congenital deformities of the nose, 475
Corrosive sublimate, appearance of œsophagus after poisoning by, 43
Coryza, 283
  ,, acute, in infants, 293
Curette, nasal, 277
  ,, Capart's, 276
Cysts in gullet, 101
Czermak, his palate hook, 248
Deformities, congenital, of the nose, 475
Deviation of the nasal septum, 431
Dilatations of the œsophagus, 114
  simple, 115 ; (*a*) primary, 115 ; (*b*) secondary, 119 ; sacciform, 121 ; symptoms, 125 ; pathology, 125 ; mortality in, 126
Diphtheria of the gullet, 69
Disease of the fifth nerve or its nasal branches, 474
Diseases of the gullet, 26
Dislocation of the nasal bones, 430
Diverticula, traction-, 126
Douche, nasal, 259
  ,, Parson's, 259
Dry catarrh, 324
  history, 324 ; etiology, 326 ; symptoms, 330 ; diagnosis, 332 ; pathology, 332 ; prognosis, 335 ; treatment, 335
Dry catarrh of the naso-pharynx, 492
Duplay's œsophageal resonator, 18
  ,, nasal speculum, 240
Dysphagia lusoria, 213
Ecraseur, nasal, 269
  ,, Jarvis's, 270
  ,, the author's, 272
Electrode, œsophageal, 17
  ,, nasal, 273
  ,, Löwenberg's nasal, 273
  ,, Lincoln's post-nasal, 273
Elsberg's nasal speculum, 241
Enchondromata of the nose, 385

Enchondroma of the naso-pharynx, 534
Entomozoaria in the nose, 459
Epistaxis, 338
    history, 338; etiology, 340; symptoms, 344; pathology, 346; diagnosis, 346; prognosis, 346; treatment, 347
Erectile tumour of the pituitary membrane, 384
Ethmoidal fissure, 234
Examination of gullet, 6
Exostoses of the nose, 390
Feeding-bottle, rectal, 24
Feeding tube, œsophageal, 23
Fibromata in gullet, 101
Fibro-mucous polypi of the naso-pharynx, 532
Fibrous polypi of the naso-pharynx, 504
    history, 505; etiology, 507; symptoms, 508; diagnosis, 510; pathology, 511; prognosis, 512
    treatment, 512
        electric cautery, 513; electrolysis, 514; ligation, 515; removal with the écraseur, 516; evulsion, 516; excision, 517; crushing, 518; gouging, 518; thermic cautery, 519; escharotics, 519
    preliminary operations for gaining access to naso-pharyngeal tumours, 520; (*a*) nasal operations, 522; (*b*) maxillary operations, 526; (*c*) palatine operations, 529
Fifth nerve, or its nasal branches, disease of, 474
Fish-hooks, removal of, from gullet, 194
Fistula, tracheo-œsophageal, 84
Follicular disease of the naso-pharyngeal space, *see* post-nasal catarrh
Foreign bodies in the gullet, 185
    history, 185; etiology, 186; symptoms, 189; pathology, 192; diagnosis, 192; prognosis, 193; treatment, 193
Foreign bodies in the nose, 440
Fractures of the nose, 426
Fränkel, his nasal speculum, 238
  ,, his post-rhinal mirror, 247
  ,, his palate hook, 248
Forceps, œsophageal, 18
  ,, ordinary polypus, 265
  ,, Gant's vine-scissor, 265
  ,, the author's punch-, 266
  ,, the axial polypus-, 267
  ,, Beverley Robinson's toothed and locking, 267
  ,, Stoker's rotatory polypus-, 268
  ,, the author's nasal bone-, 268
  ,, post-nasal, 274
  ,, Löwenberg's post-nasal, 274
  ,, the author's sliding post-nasal, 275
  ,, Adams's, for breaking down the septum, 281
Gant's vine-scissor forceps 265
Gastrostomy, 145
    history of operation, 146; method of performing operation, 146; manner of feeding after operation, 150; statistics of operation, 150—152; advantages of operation, 151; disadvantage of operation, 152
Glanders, 416
    history, 417; etiology, 418; symptoms, 419; diagnosis, 421; pathology, 422; prognosis, 423; treatment, 423
Goodwillie's nasal speculum, 239
Gottstein's cotton-wool tampon, 282
Gräfe's coin-catcher, 20
Gross's nasal spuds, 281
Gullet, abscess of, 56
    history, 57; etiology, 58; symptoms, 59; diagnosis, 61; pathology, 62; prognosis, 63; treatment, 63
  ,, adenoma polyposum in, 102
  ,, anatomy of, 1
  ,, aphthæ of, 64
  ,, auscultation of, 7
  ,, cancer of, *see* malignant tumours of
  ,, calcification of, 98
  ,, calibre of, 2, 3, 4
  ,, cartilaginous stricture of, 98

Gullet, cicatricial stricture of, 129
history, 129 ; etiology, 130 : symptoms, 130 ; position, 131; diagnosis, 132 ; pathology, 132 ; prognosis, 133 ; treatment, 134 ; case of, 154; gentle dilatation, 134; forcible dilatation, 135
,, compression of, 158
,, cysts in, 101
,, dilatations of, 114
simple dilatations, 115 ; (*a*) primary, 115 ; (*b*) secondary, 119 ; sacciform, 121 ; symptoms, 125; pathology, 125 ; mortality, 126
,, diphtheria of, 69
,, diverticula in 126
,, examination of, 6
,, experiments on, 163
,, fibromata in, 101
,, foreign bodies in, 185
history, 185 ; etiology, 186 ; symptoms, 189 ; pathology, 192 ; diagnosis, 192 ; prognosis, 193 ; treatment, 193
,, inflammation of, *see* œsophagitis, acute, 26
,, lipomata in, 102
,, malformations of, 216
history, 217 ; etiology, 219 ; symptoms, 222 ; pathology, 222 ; diagnosis, 224 ; prognosis, 224 ; treatment, 225 ; case of, 226
,, malignant tumours of, 71 ; cancer, 71
history, 71 ; etiology, 73 ; symptoms, 78 ; pathology, 85 ; diagnosis, 90 ; prognosis, 92 : treatment, 92 : table of cases of, 74 ; most frequent seat of, 87
,, myomata in, 102
,, neuroses of, 198
,, non-malignant tumours of, 98
polypi, 98 ; warty growths, 101 : cysts, 101 : fibromata, 101 ; adenoma polyposum, 102 ; lipomata, 102 ; myomata, 102
,, ossification of, 98
,, paralysis of, 198
history, 198 ; etiology, 199 : symptoms, 201 : pathology, 203 : diagnosis, 203 ; prognosis, 204 ; treatment, 204 : case of, 205
Gullet, perforation of, 84
,, polypi of, 98
,, post-mortem softening of, 229
,, relations of, 5
,, removal of fish-hooks from, 194
,, rupture of, 160
position, 164 : history, 161 : etiology, 162 : symptoms, 170 : pathology, 170: diagnosis, 171 : prognosis 172 ; treatment, 172 ; table of cases, 178 ; Boerhaave's case of rupture, 173; Fitz's case of rupture, 176
,, sarcomata in, 97
,, simple stenosis of, 156
,, sounding the, 10
,, spasm of, 207
history, 207 : etiology, 208 : symptoms, 211 ; diagnosis, 213 : pathology, 213 ; prognosis, 214 : treatment, 215
,, spasmodic stricture of, 90
,, structure of, 5
,, syphilis of, 105
,, thrush of, 64
,, traction-diverticula of, 126
,, traumatic stricture of, 91
,, tubercular disease of, 112
,, ulcer of, 38
,, varicose veins of, 50
,, warty growths in, 101
,, wounds of, 182
Hæmatoma of the nasal septum, 437
Hæmostatic instruments, nasal, 277
Hay fever, 299
history, 299 : etiology, 301 : (*a*) predisposing causes, 301 : (*b*) exciting, 303 : symptoms, 309: diagnosis, 310: prognosis, 310: pathology, 310 : treatment, 310
Hereditary syphilis of the nose, 405
Hiatus semilunaris, 234
Hilton's improved snare, 269
Hypertrophy of the mucous membrane of the nose, 317
Infants, œsophagitis in, 35
Inhalations, nasal, 264
Injectors, œsophageal, 17

Insects, œsophagitis caused by stings of, 45
Jarvis's combined tongue-depressor and post-nasal mirror, 246
,, nasal écraseur, 271
Lefferts's spray-producer, 262
Lincoln's post-nasal electrode, 273
Lipomata in gullet, 102
Livingston's pneumatic spray-producer, 263
Lowenberg's nasal electrode, 273
,, post-nasal forceps, 274
Lupus of the pituitary membrane, 412
Maggots in the nose, 448
    history, 448; etiology, 454; symptoms, 456; diagnosis, 457; pathology, 457; prognosis, 457; treatment, 457
Malformation of the œsophagus, 216
    history, 217; etiology, 219; symptoms, 222; pathology, 222; diagnosis, 224; prognosis, 224; treatment, 225; case of, 226
Malignant tumours of the gullet, *see* gullet
Malignant tumours of the naso-pharynx, 536
Malignant tumours of the nose, 391
Massei's modification of Duplay's nasal speculum, 241
Mucous membrane of the nose, description of, 234
,, hypertrophy of, 317
Myomata in gullet, 102
Nasal bones, dislocation of, 130
,, bougies, 254
,, brushes, 257
,, catarrh, acute, 283
    history, 283; etiology, 284; symptoms, 288; diagnosis, 289; prognosis, 290; pathology, 290; treatment, 290
,, catarrh, purulent, 294
,, catarrh, chronic, 312
,, caustic-holders, 257
,, choanæ, 232
,, curette, 277
    Capart's, 276
,, douche, 259
    Parson's, 259
,, écraseurs, 269
    Jarvis's, 270
    the author's, 272
Nasal electrodes, 273
    Löwenberg's, 273
    Lincoln's post-nasal, 273
,, forceps, 265
    Gant's vine-scissor, 265
    the author's punch, 266
    the axial polypus-, 267
    Beverley Robinson's toothed and locking, 267
    Stoker's rotatory, 268
    the author's bone-, 268
    Löwenberg's post-nasal, 274
    the author's sliding post-nasal, 275
    Adams's, for breaking down the septum, 281
,, fossæ, anatomy of, 232
    synechiæ of, 479
,, hæmostatic instruments, 277
,, inhalations, 264
,, inhaler, Whistler's, 264
,, insufflators, 255
,, plugs, 277
    Cooper Rose's, 280
    Frank's, 279
    Gottstein's, 282
    St. Ange's, 278
,, probes, 254
,, septum, abscess of, 439
    blood tumours of, 437
    deviation of, 431
,, shields, 255
,, snare, 269
,, specula, 238
    Cresswell Baber's, 239
    Duplay's, 240
    Elsberg's, 241
    Frankel's, 238
    Goodwillie's, 239
    Massei's modification of Duplay's, 241
    Schuster's, 241
    Spencer Watson's, 239
    Thudichum's, 239
    Voltolini's, 241
    Von Tröltsch's modification of Fränkel's, 238
    Zaufal's funnel-, 242
,, spray-producer, anterior, 261
    posterior, 262
    Lefferts's, 262
    Livingston's pneumatic, 263
,, spuds, 281
,, syringes, 265

Nasal tampon, Gottstein's, 282
,, the author's temporary sponge-, 283
Naso-pharynx, adenoid vegetations of, 494
history, 494 ; etiology, 495; symptoms, 497 ; diagnosis, 500 ; pathology, 501 ; prognosis, 502 ; treatment, 502
,, chronic catarrh of, 482
history, 482 ; etiology, 483 ; symptoms, 489 ; pathology, 490 ; diagnosis, 490 ; prognosis, 491 ; treatment, 491
,, dry catarrh of, 492
,, enchondroma of, 534
,, fibro-mucous polypi of, 532
,, fibrous polypi of, 504
history, 505 ; etiology, 507 ; symptoms, 508 ; diagnosis, 510 ; pathology, 511 ; prognosis, 512
treatment, 512
electric cautery, 513 ; electrolysis, 514 ; ligation, 515 ; removal with the écraseur, 516 ; evulsion, 516 ; excision, 517 ; crushing, 518 ; gouging, 518 ; thermic cautery, 519 ; escharotics, 519
preliminary operations for gaining access to naso-pharyngeal tumours, 520 ; (*a*) nasal operations, 522 ; (*b*) maxillary operations ; 526 ; (*c*) palatine operations, 529
,, malignant tumours of, 536
Neuroses of the gullet, 198
Non-malignant tumours of nose, *see* nose
Nose, affections of, in eruptive fevers, and other acute diseases, 424
,, diphtheria, Vol. i. p. 185
,, influenza, 426
,, measles, 424
,, rheumatism, 425
,, scarlet fever, 424
,, small-pox, 425
,, typhoid fever, 425
,, anatomy of, 232
,, bleeding from the, 338
history, 338 ; etiology, 340 ; symptoms, 344 ; pathology, 346 ; diagnosis, 346 ; prognosis, 346 ; treatment, 347
Nose, chronic blennorrhœa of, 337
,, congenital deformities of, 475
,, enchondromata of, 385
,, entomozoaria in, 459
,, exostoses of the, 390
,, fibrous polypi of, 381
,, foreign bodies in, 440
,, fractures of, 426
,, hereditary syphilis of, 405
,, hypertrophy of mucous membrane of, 317
,, maggots in, 448
history, 448 ; etiology, 454 ; symptoms, 456 ; diagnosis, 457 ; pathology, 457 ; prognosis, 457 ; treatment, 457
,, malignant tumours of, 391
,, non-malignant tumours of, 353
enchondromata, 385 ; erectile tumour of the pituitary membrane, 384 ; exostoses, 390 ; fibrous polypi, 381 ; osteomata, 387 ; papillomata, 382 ; polypus, 353
,, osteomata of, 387
,, papillomata of, 382
,, polypus of, 353
history, 353 ; etiology, 355 ; symptoms, 357 ; diagnosis, 363 ; pathology, 364 ; prognosis, 366 ; treatment, 367 ; (*a*) evulsion, 368 ; (*b*) abscission, 377 ; (*c*) electric cautery, 380
,, syphilitic affections of, 396
history, 396 ; etiology, 397 ; symptoms, 399 ; diagnosis, 401 ; pathology, 402 ; prognosis, 403 ; treatment, 404
Œsophageal abscess, 56
,, bougies, 10
method of passing, 11
,, brushes, 17
,, electrode, 17
,, feeding tube, 23
,, forceps, 18
,, injectors, 17
,, permanent tube, 22
,, resonator, 17
,, sound, 8

Œsophagism, 207
Œsophagitis, acute, 26
    history, 26; etiology, 27; symptoms, 28; pathology, 29; diagnosis, 31; prognosis, 32; treatment, 32; cases of, 33
  ,, chronic, 46
    etiology, 46; symptoms, 47; pathology, 48; diagnosis, 48; prognosis, 49; treatment, 49
  ,, from stings of insects, 45
  ,, from swallowing acids, 40
  ,, from swallowing alkalies, 40
  ,, in infants, 35
  ,, phlegmonous, 37
  ,, produced by antimony, 41
  ,, traumatic, 39
    history, 39; etiology, 40; symptoms, 40; pathology, 43; diagnosis, 43; prognosis, 44; treatment, 44
Œsophagoscope, Bevan's, 11
  ,, Semeleder's, 13
  ,, Stoerk's, 15
  ,, the author's, 15
  ,, Waldenburg's, 14
Œsophagoscopy, 13
Œsophagostomy, 139
    history of the operation, 139; method of performing, 142; advantages of, 144; disadvantages of, 145
Œsophagotome, 21
Œsophagotomy, external, 196
  ,, internal, 136
    advantages of, 137; disadvantages of, 138
Œsophagus, abscess of, 56
    etiology, 58; symptoms, 59; diagnosis, 61; pathology, 62; prognosis, 63; treatment, 63
  ,, adenoma polyposum in, 102
  ,, anatomy of, 1
  ,, aphtha of, 64
  ,, auscultation of, 7
  ,, calcification of, 98
  ,, calibre of, 2, 3, 4
  ,, cancer of, *see* malignant tumours of
  ,, cartilaginous stricture of, 98
Œsophagus, cicatricial stricture of, 129
    history, 129; etiology, 130; symptoms, 130; position, 131; diagnosis, 132; pathology, 132; prognosis, 133; treatment, 134; case of, 154; gentle dilatation of, 134; forcible dilatation of, 135
  ,, compression of, 158
  ,, cysts in, 101
  ,, dilatations of, 114
    simple, 115; (*a*) primary, 115; (*b*) secondary, 119
    sacciform, 121
      symptoms, 125; pathology, 125; mortality in, 126
  ,, diphtheria of, 69
  ,, examination of, 6
  ,, fibromata in, 101
  ,, foreign bodies in, 185
    history, 185; etiology, 186; symptoms, 189; pathology, 192; diagnosis, 192; prognosis, 193; treatment, 193
  ,, lipomata in, 102
  ,, malformations of, 216
    history, 217; etiology, 219; symptoms, 222; pathology, 222; diagnosis, 224; prognosis, 224; treatment, 225; case of, 226
  ,, malignant tumours of, 71
    history, 71; etiology, 73; table of cases, 74; symptoms, 78; pathology, 85; diagnosis, 90; prognosis, 92; treatment, 92; most frequent seat of, 87
  ,, myomata in, 102
  ,, non-malignant tumours of, 98
    adenoma polyposum, 102; cysts, 101; fibromata, 101; lipomata, 102; myomata, 102; polypi, 98; warty growths, 101
  ,, ossification of, 98
  ,, paralysis of, 198
    history, 198; etiology, 199 symptoms, 201; pathology 203; diagnosis, 203; prognosis, 204; treatment 204; case of, 205

Œsophagus, perforation of, 84
,, polypi of, 98
,, post-mortem softening of, 229
,, relations of, 5
,, removal of fish-hooks from, 194
,, rupture of, 160
position, 164 ; history, 161 ; etiology, 162 ; symptoms, 170 ; pathology, 170 ; diagnosis, 171 ; prognosis, 172 ; treatment, 172 ; table of cases of, 178
Boerhaave's case of, 173
Dr. Fitz's case of, 176
,, sarcomata in, 97
,, simple stenosis of, 156
,, sounding the, 10
,, spasm of, 207
history, 207 ; etiology, 208 ; symptoms, 211 ; diagnosis, 213 ; pathology, 213 ; prognosis, 214 ; treatment, 215
,, spasmodic stricture of, 90
,, structure of, 5
,, syphilis of, 105
,, thrush of, 64
,, traction-diverticula in, 126
,, traumatic stricture of, 91
,, tubercular disease of, 112
,, ulcer of, 38
,, varicose veins of, 50
,, warty growths in, 101
,, wounds of, 182
Ossification of œsophagus, 98
Osteomata of the nose, 387
Ostium maxillare accessorium, 234
Palate-hooks, 247
Papillomata of nose, 382
Paralysis of the gullet, 198
history, 198 ; etiology, 199 ; symptoms, 201 ; pathology, 203 ; diagnosis, 203 ; prognosis, 204 ; treatment, 204
case of, 205
Parasol probang, 19
Parosmia, 472
Peri-œsophageal abscess, 56
Pharyngeal sound, 8
Phlegmonous œsophagitis, 37
Phosphorus, poisoning by, 41, 44
Pituitary membrane, lupus of, 412
,, tubercular disease of, 108
Plugs, nasal, 277
Cooper Rose's, 280
Frank's, 279
St. Ange's 278
Poisons, œsophagitis caused by corrosive, 40
Polypi of the gullet, 98
,, fibro-mucous, of the naso-pharynx, 532
,, fibrous, of the nose, 381
,, fibrous, of the naso-pharynx, 504
history, 505 ; etiology, 507 ; symptoms, 508 ; diagnosis, 510 ; pathology, 511 ; prognosis, 512
,, treatment, 512
electric cautery, 513 ; electrolysis, 514 ; ligation, 515 ; removal with the écraseur, 516 ; evulsion, 516 ; excision, 517 ; crushing, 518 ; gouging, 518 ; thermic cautery, 519 ; escharotics, 519
preliminary operations for gaining access to naso-pharyngeal tumours, 520 ; (*a*) nasal operations, 522 ; (*b*) maxillary operations, 526 ; (*c*) palatine operations, 529
Polypus of the nose, 353
history, 353 ; etiology, 355 ; symptoms, 357 ; diagnosis, 363 ; pathology, 364 ; prognosis, 366 ; treatment, 367 ; (*a*) evulsion, 368 ; (*b*) abscission, 377 ; (*c*) electric cautery, 380
Post-mortem softening of the gullet, 229
Post-nasal catarrh, 482
history, 482 ; etiology, 483 ; symptoms, 489 ; pathology, 490 ; diagnosis, 490 ; prognosis, 491 ; treatment, 491
,, electrode, Lincoln's, 273
,, forceps, 274
Lowenberg's, 274
the author's sliding, 275
,, mirror, Fränkel's, 247
Jarvis's, 246
,, plug, St. Ange's 278

Post-nasal snare, Stoerk's, 276
Post-œsophageal abscess, 56
Post-rhinal image, 252
Probang, parasol-, 19
  sponge-, 21
Rectal feeding-bottle, 24
Resonator, Duplay's œsophageal, 17
Retro-nasal catarrh, *see* post-nasal catarrh
Retro-œsophageal abscess, 56
Rhinal mirror, 246
Rhinitis, traumatic, 296
Rhinobyon, 278
Rhinoliths, 444
Rhinoscleroma, 414
Rhinoscopy, anterior, 237
  ,, the application of, 243
  ,, median, 245
  ,, posterior, 245
  ,, the application of, 251
  ,, by double reflection, 254
Robinson, Beverley, his toothed and locking forceps, 267
Rose catarrh, *see* hay fever
Rupture of gullet, 160
  history, 161 ; etiology, 162 ; symptoms, 170 ; pathology, 170 ; diagnosis, 171 ; prognosis, 172 ; treatment, 172
Sarcoma in gullet, 97
Schrotter's porte-caustique, 257
Schuster's nasal speculum, 241
Shurly's nasal shield, 255
Smith, Andrew, his nasal insufflator, 256
  his modified caustic-holder, 258
Snare, Jefferson Bettman's modification of Jarvis's, 271
  ,, Hilton's improved, 269
  ,, Jarvis's, 270
  ,, the author's polypus-, 270
Sound, pharyngeal, 8
  ,, œsophageal, 8
Sounding the œsophagus, 10
Spasm of the œsophagus, 207
  history, 207 ; etiology, 208 ; symptoms, 211 ; diagnosis, 213 ; pathology, 213 ; prognosis, 214 ; treatment, 215
Sponge-probang, 21
Stenosis of gullet, simple, 156
Stoker's rotatory polypus-forceps, 267
Stricture of the œsophagus, cicatricial, 129
  etiology, 130 ; symptoms, 130 ; position, 131 ; diagnosis, 132 ; pathology, 132 ; prognosis, 133 ; case of, 154
  treatment, 134
    gentle dilatation, 134
    forcible dilatation, 135
  ,, malignant, *see* cancer
  ,, spasmodic, 90
  ,, traumatic, 91
Summer catarrh, *see* hay fever
Synechiæ of the nasal fossæ, 479
Syphilis of the gullet, 105
  ,, hereditary, of the nose, 405
Syphilitic affections of the nose 396
  history, 396 ; etiology, 397 ; symptoms, 399 ; diagnosis, 401 ; pathology, 402 ; prognosis, 403 ; treatment, 404
Tampon, Gottstein's temporary cotton-wool-, 282
  the author's temporary sponge-, 283
Throat-deafness, 538
Thrush of the gullet, 64
Thudichum, his nasal speculum, 239
Tongue-spatulas, 251
Traction-diverticula, 126
Traumatic œsophagitis, 39
  history, 39 ; etiology, 40 ; symptoms, 40 ; pathology, 43 ; diagnosis, 43 ; prognosis, 44 ; treatment, 44
  ,, rhinitis, 296
Tubercular disease of the gullet, 112
  ,, of the pituitary membrane, 108
Tumour, erectile, of the pituitary membrane, 384
  ,, malignant, of the gullet, *see* gullet
    of the nose, 391
    of the naso-pharynx, 535
  ,, non-malignant, of the gullet, *see* gullet
  ,, of nose, *see* nose
Turbinated bones, structure of, 236
  ,, occasional fourth, 233
  ,, arrangement of veins over, 2[illegible]
  ,, erectile tissue covering, 236
Ulcer of gullet, 38

Veins, varicose, of gullet, 50
Voltolini, his nasal speculum, 241
,, his palate-hook, 248
,, his uvula-noose, 249
Von Tröltsch's modification of Fränkel's nasal speculum, 238
Warty growths in gullet, 191
Watson, Spencer, his nasal speculum, 239
Whistler, his nasal inhaler, 264
Wounds of the gullet, 182
Zaufal, his funnels, 242

INDEX OF AUTHORS REFERRED TO.

Abercrombie, 57, 61
Abulcasis, 354, 392
Actuarius, 325
Adams, 161, 281, 282, 426, 429, 432
Adelmann, 186, 188, 506, 530
Ætius, 198, 324, 353
Albert, 146, 149, 368, 371
Albrecht, 460
Alibert, 285
Allbutt, Clifford, 7
Allen, Harrison, 258, 432, 477
Althaus, 316, 462, 463, 466, 471,
472, 474, 475
Amory, 215
Anders, 146
Andral, 65, 67, 112
Andrew, 192
Anglada, 284, 286, 306
Annandale, 83, 111, 144, 218
Ansiaux, 505, 529
Arantius, 354
Arbuthnot, 64
Aretæus, 339
Arrowsmith, 99
Atherton, 195
Audibert, 51
Avicenna, 72
Axmann, 441
Ayres, 218
Azara, 449
Baber, Creswell, 239
Babington, 344
Bailey, 161
Baillie, 65, 72, 99
Baizeau, 188
Ball, 468
Ballot, 58, 63
Baraffio, 186
Baratoux, 400
Barras, 30
Barthez, 58, 61, 63
Bartholin, 444, 460
Basham, 131
Bassereau, 399
Baster, 205
Bastian, 308
Baud, 187, 194
Baudrimont, 519
Bauer, 462, 463, 471
Baumès, 245
Baxt, 251
Bayer, 333
Bayle, 130
Beard, 300, 301, 471
Beaussenat, 437
Bécourt, 297
Bégin, 197, 530
Béhier, 40, 72, 74, 76, 130
Behr, 460
Behrends, 448
Belfrage, 37
Bell, 72, 114, 130, 186
Bellocq, 277, 339
Belz, 125
Bendall, 417
Bendz, 218
Benevenius, 460
Bensch, 507
Benson, 38
Bérard, 437, 461
Berg, 65
Bert, Paul, 53
Bertier, 64
Bettali, 210
Betts, 477
Beutel, 72, 129
Bevan, 14
Bidau, 144

Bierfreund, 187
Bigelow, 236
Billard, 27, 35, 65, 106, 284
Billroth, 96, 107, 122, 187, 414
Birkett, 512
Blache, 65
Blackley, 300, 302, 304, 305, 307, 310
Blake, Clarence, 270
Blandin, 432, 436, 505
Blasius, 114, 115, 156, 217, 440
Bleuland, 26, 57, 65, 67, 207
Blondeau, 348
Boehm, 26
Boerhaave, 65, 105, 161, 171, 173, 295, 354
Bollinger, 417, 418, 419, 420
Bonet, 462, 467, 468, 469, 470
Bonnes, 518, 533
Bonnet, 72
Bordenave, 185, 387
Borelli, 477, 518
Bostock, 299
Bosworth, 272, 313, 320, 323, 337, 483
Botrel, 506, 530, 531
Bouchard, 422
Boucher, 218
Bouchut, 284, 293
Boulard, 188
Bourceret, 160
Bournéria, 186
Bouteille, 210
Bowman, 163
Boyd, Stanley, 161, 417
Boyer, 182, 440
Bozzini, 245
Bradley, Messenger, 146
Brandeis, 481
Braune, 2, 10
Brazier, 120, 208
Breschet, 466
Bresgen, 313, 314, 360, 483, 488
Bretonneau, 70
Brinton, 209
Bristowe, 51
Broca, 215
Brodie, 217, 400, 414
Bron, 440
Bronardel, 417, 423
Brown, 417
Browne, Lennox, 159, 483, 489, 492
Browne, W. N., 444
Bruckmann, 460
Bruns, 506, 514
Bruns, Von, 140, 350, 506
Bruyerinus, 341
Bryant, 107, 146, 358, 367, 368, 385, 507
Bryk, 141, 536
Buchanan, 146
Budd, 229
Bugantz, 146
Butlin, 72, 75, 85, 88, 142
Bücking, 124
Callender, 146
Camerarius, 284
Canton, 229
Capart, 276, 495, 503
Capitan, 422
Carmichael, 61
Carron, 210
Casabianca, 298, 425, 437, 441
Casper, 40, 43
Cassan, 156
Castresana, 187
Catlin, 373
Catti, 317
Caulet, 58, 60
Cayol, 130
Cazenave, 313, 325, 412
Celsus, 65, 324, 353, 392, 405
Chapman, 98
Charcot, 425
Charles, 161
Charous, 422
Chassaignac, 432, 434, 435, 437, 506
Chauliac, Guy de, 354
Chauveau, 204
Cheever, 140, 507, 528
Chelius, 296
Chevallier, 297
Chevers, Norman, 188
Chiari, 416
Chrysostome, Dion, 397
Chvostek, 112
Ciniselli, 514
Clark, Andrew, 146, 494, 507
Claubry, Gauthier de, 190
Clander, 444
Cloquet, 284, 285, 286, 287, 325, 340, 433, 437, 462
Closset, 350
Coats, Joseph, 85, 100
Cohen, Solis, 260, 291, 313, 328, 477, 495, 502, 503, 514
Coiter, 72
Coles, Oakley, 497
Colles, W., 351, 355, 359
Cook, 144

Coomes, 288
Cooper, Sir Astley, 57, 159
Cooper, Samuel, 535
Coote, Holmes, 332, 429
Coquerel, 449, 460
Corbel, 425
Cornil, 46, 290, 364, 414, 416
Courant, 207
Courvoisier, 146
Cozzolino, 326
Crato, Johannes, 325
Créquy, 351
Cripps, Harrison, 523
Cruveilhier, 65, 119, 156, 218, 364
Cullen, 339
Cullerier, 538
Cumin, 130
Curling, 146
Cusack, 106
Cutter, Ephraim, 288
Czermak, 237, 246, 247 491
Czerny, 96, 133, 136
Dallas, 99, 100
Daly, 300, 308, 360, 362
Darwin, 307
Davasse, 398
David, 497
Davis, 218
Davy, 117
Daykin, 288
Dechant, 424
Decroix, 419
De Gardi, Matthias, 444
De Graef, 99
Deguise, 517
Delle Chiaje, 116
Delpech, 297, 298
Demarquay, 444, 506, 521, 536
Dendy, 123
Denonvilliers, 506
Desault, 205
Deschamps, 460, 462, 467
Desgranges, 188, 520
Deville, 398
Dewar, 130
Dieffenbach, 505, 519, 521, 529
Dionis, 237
Dobell, 482
Dolan, 209
Dolbeau, 22, 136, 518
Donaldson, 367
Donders, 284
Dryden, 161
Dubois, 99, 103, 515
Duménil, 517, 533
Duparcque, 58, 60
Duplay, 59, 237, 251, 364, 368, 387, 392, 393
Dupuytren, 182, 195, 357, 522
Duret, 51
Durham, 23, 146, 182, 355, 377, 385
Durston, 217
Dusaussay, 51
Dzondi, 355, 377
Eberth, 51, 100
Ebstein, 51
Eckhold, 185, 197
Edwards, 295
Egeberg, 146
Elias, 146
Elliotson, 299, 314, 417, 423
Elsberg, 7, 136, 361
Emmert, 477
Emminghaus, 159
Erichsen, 367, 368, 385, 407
Escher, 146
Espagne, 70
Esquirol, 199
Eustache, 505
Evans, 141
Fabricius ab Acquapendente, 325, 354
Fabricius Hildanus, 339, 344
Fabry, 396
Fagge, Hilton-, 78, 100 156
Fauvel, 51
Fayrer, 392
Fehr, 460
Félizet, 147
Fenger, 146
Féré, 122, 384
Fergusson, 368, 371
Fernel, 72
Fernet, 476
Ferrand, 70
Ferrier, 291, 468
Fischer, 514
Fitz, 161
Flaubert, 506
Flaudin, 199
Fleming, 57, 58, 61, 437
Fletcher, 468
Follin, 59, 72, 106, 140, 144, 208, 364, 387
Foot, 208
Forcellini, 324
Forest, 460
Forster, Cooper, 80, 146, 507, 517
Fournier, 186

Fowler, 146, 147
Fox, 146
Frank, 335
Frank, J. P., 26, 284, 293, 340, 342, 346, 352, 464, 482
Frank, P., 51, 284
Frankenau, 466
Franks, Kendal, 130, 135, 326, 329
Frantzius, 449, 453
Fränkel, B., 237, 326, 328, 329, 330, 337, 343, 352, 360, 387
Fränkel, E., 326, 332, 335, 403, 408
Frédéricq, 367
Fridberg, 115, 126
Friedreich, 284, 287
Fritsche, 76, 77
Fugier, 131
Gahrlieb, 448
Galen, 26, 51, 57, 72, 198, 324, 339, 353
Gallway, 331
Gamgee, 417
Gant, 265, 368
Garengeot, 505, 521, 529
Gassner, 123
Gaubert, 387
Gautier, 58, 60, 62
Gay, 186
Geber, 414
Gebser, 186
Gendron, 130
Gerdy, 357, 381, 392
Gerlach, 424
Gernet, 218
Gianella, 114
Gibb, 159
Gietl, 425
Gillette, 58
Glandorp, 354, 392
Godinet, 191
Godou, 107
Golding-Bird, 83, 146, 196
Gonzalez, 149
Goodwillie, 239, 322, 391
Gordon, 39, 299
Gosselin, 506, 513, 515
Gottstein, 282, 319, 326, 329, 330, 333, 334, 336
Gouguenheim, 120
Gradenwitz, 120
Grammatzki, 161
Grashuis, 114
Graves, 27, 400, 417, 462, 463
Gräfe, 20, 444
Greenhow, 70
Gréhant, 372
Griffin, 161
Gritti, 146
Gross, 142, 153, 280, 351, 358, 377, 511, 536
Gruber, 238
Gruner, 355, 359
Grynfeldt, 392
Guattani, 196
Gubler, 51, 52, 215
Guérin, 518
Guersant, 161
Guise, 183
Gulcke, 514
Gurlt, 427, 429
Guye, 495, 504
Gunz, 325
Gyser, 76, 98
Habber, 460
Habermann, 238
Habershon, 31, 75, 87, 351
Hack, 300, 308, 319, 361, 362, 447
Hadden, 51
Hadlich, 141, 159
Haken, 186
Haller, 431
Hamburger, 7, 27, 76, 172, 208, 212
Hamilton, 427, 428
Hannay, 116
Harrison, 186, 187, 423
Hartmann, 329, 358
Harvey, 538
Hänisch, 360
Heath, 146, 217, 527
Hebra, 412, 414
Hedenius, 37
Heister, 185, 355
Helmholtz, 300
Henoch, 77
Hénocque, 186
Hering, 144
Herrgott, 518
Heurtaux, 385
Hévin, 185, 186, 187, 188, 195
Heyfelder, 161
Heymann, 159
Hickman, 440, 441
Hildanus, 343, 345, 348, 349
Hildebrandt, 432, 476
Hill, Berkeley, 108, 507, 521
Hillairet, 297, 298

Hilton, 387
Hinton, 539
Hippocrates, 65, 207, 284, 339, 345, 353, 392, 426, 428
Hirschsprung, 217, 218, 220
Hjort, 146
Hocken, 59
Hoffmann, 199, 207, 230, 339, 340, 344, 347, 352
Holmes, Timothy, 142, 144, 226
Holmer, 141, 187, 189
Home, Sir Everard, 72, 87, 156, 210, 211
Honkoop, 26
Hope, 458
Hopmann, 382, 383, 393
Hoppe, 476
Horsey, 133, 141
Horteloup, 182, 183
Houston, 218
Howse, 148, 149
Howship, 72, 209
Hueter, 368
Huguier, 506, 530
Hume, 146
Hunt, 411
Hutchison, 465
Hünerswolff, 306
Hyrtl, 334, 476
Icart, 505, 517
Ilott, 218
Jackson, V., 146
Jackson, Hughlings, 346, 468, 169, 473
Jacob, 419
Jacobi, 146, 147
Jacquemin, 145
Jacquin, 360
Jamain, 348
Jarjavay, 126, 138, 518
Joal, 360
Jobert, 184, 529
Joffroy, 121
Jones, Sydney, 80, 146
Jouon, 146
Jurasz, 282, 432
Kaposi, 412, 414, 416
Kappeler, 96, 111, 146
Keetley, 319
Keller, 40, 130, 133
Kern, 411
King, 413
King, Wilkinson, 161
Kirschmann, 458
Klebs, 52, 87, 116
Klose, 124
Knott, 27, 38, 106, 112, 116, 159, 182
Kohlrausch, 236
Kohts, 284, 293
Köhler, 200
Kölliker, 221
König, 52, 72, 89, 141
Köstlin, 444
Krause, 326, 329, 330, 334, 335
Krishaber, 23, 468, 469
Krönlein, 146
Kunze, 352
Kussmaul, 284, 293
Küchenmeister, 278, 350
Kühne, 123
Küster, 146
Labbé, 533
Laboulbène, 27, 28, 30, 41, 58, 70, 102, 109, 112
Lafont, 512
Lagneau, 425
Lahory, 419
Lallemand, 218
Lamb, 219
Lancereaux, 398
Landouzy, 419
Lannelongue, 136, 146
Lange, 460
Lange, Victor, 495
Langelott, 460
Langenbeck, Von, 186, 187, 195, 197, 506
Langenbuch, 147
Langton, 146
Lanzoni, 460
Lapeyroux, 278, 350
Laprade, 188
Larrey, 182, 190, 199, 214
Laurent, 194
Lavacherie, 139
Laveran, 408
Lawrence, 525
Lawson, 441
Laycock, 340, 341
Lebert, 72, 73, 76, 81, 89
Lecœur, 125
Lediberder, 51
Le Dentu, 146, 535
Lefferts, 262, 477
Legouest, 387, 388, 389, 441, 533
Lehmann, 218
Lélut, 65
Lemaistre, 441
Lémeré, 369

Leriche, 358
Leroux, 77, 130
Leroy, 187, 194
Leube, 25
Levillain, 182
Levret, 355, 505
Levy, 218
Lichtenberg, 381
Lieutaud, 72
Lincoln, R. P., 507, 513, 514, 515, 521
Lindau, 119
Linnæus, 456
Little, 21
Littlewood, 146
Lockemann, 472
Longoburgensis, Bruno, 392
Longuet, 430
Lorent, 293
Lorin, 417
Low, 146
Lower, Richard, 292
Lozach, 217
Löffler, 422
Löwe, 361
Löwenberg, 273, 289, 313, 432, 494, 495, 496, 504
Luc, 425, 437
Ludlow, 114, 123
Luschka, 117, 218, 220, 477
Lusitanus, 459
Luton, 40, 72, 107, 195
Lücke, 146, 368
MacCormac, 146, 507, 524
Macgregor, 449
Mackenzie, John, 362
Macnamara, Rawdon, 340, 341, 352
Macquart, 99
Maddock, 366
Maisonneuve, 112, 136, 437, 475, 506, 529
Malgaigne, 430
Mankiewicz, 449, 453
Manne, 505
Marchand, 121
Maréchal, 460
Markusovzsky, 237
Marriques, 218
Marsh, 300
Martin, 186, 217, 326
Martineau, 345
Maschka, 218
Masini, 336
Mason, 146, 356, 392, 429
Massei, 241, 326, 330, 336
Mathieu, 355, 533
Mauriac, 398
Maury, 106, 146
Maydl, 142, 146, 149, 152
Mayern, Sir Thomas, 325
Mayo, 114
McCarthy, 146
McDonnell, 537
McGill, 146
McKibben, 214
McRuer, 377
Meckel, 219, 220
Mellor, 217
Menzel, 140
Méplain, 188
Merkel, G., 128
Meyer, 161, 192
Meyer, H., 233
Meyer, Wilhelm, 275, 495, 497, 500, 539, 540
Meyrick, 424
Michael, 275
Michel, Carl, 237, 247, 313, 326, 329, 335, 366, 369, 371, 380, 436, 495
Middeldorpf, 1, 99, 380
Mignot, 186
Mikulicz, 16, 414
Moinel, 412
Mondière, 27, 28, 31, 58, 59, 72, 84, 159, 186, 199, 208
Monneret, 52, 351
Monod, 140
Monro, 72, 99, 119, 161, 199, 204, 208, 210
Montant, 200
Monti, 187
Moore, 299, 449
Moore, Milner, 146
Moquin-Tandon, 448, 449, 452, 453, 458
Morand, 377, 505, 529
Morel, 119
Morgagni, 57, 72, 77, 98, 114, 130, 159, 199, 314, 339, 344, 355, 431, 461
Morris, Henry, 146, 507, 521
Mosler, 341, 352
Mott, 505
Motta, 87
Moure, 64
Mouton, 1, 2, 224
Moxon, 106, 119, 160
Moller, 146

Mulhall, 360
Muron, 511
Müller, Max, 534
Nannoni, 505, 529
Négrier, 348
Nélaton, 367, 506, 508, 509, 514, 530
Nessi, 505
Nettleship, 316
Neumann, 78, 393, 414, 511
Nevot, 186
Nicoladoni, 120, 141
Niemeyer, 64
Nisbet, 538
Notta, 463, 464, 466, 470
Nourse, 444
Ogle, 117, 123, 218, 463, 466, 468
Ohdedar, 449
Ollenroth, 201
Ollier, 506, 511, 517, 519, 525, 529, 530
Ollivier, 387
Oppolzer, 112, 116, 161
Osiander, 417
Padieu, 218
Padova, 27, 28
Pagenstecher, 218
Paget, 507
Palasciano, 526
Palletta, 30, 106, 392, 394
Pallucci, 355
Pamard, 387
Panas, 235, 532, 533
Paré, Ambroise, 182, 325, 392, 426
Parkes, 183
Parrot, 66, 67, 69
Paul of Ægina, 324, 339, 354
Paulicki, 112
Pawlikowski, 186
Péan, 393, 437
Pellizzari, 414
Périer, 218
Peter, 289
Petit, 116, 510, 529, 535, 536
Petrequin, 149, 153
Petri, 75, 76, 87
Petruuti, 57, 58, 59, 63
Peyer, 317
Phœbus, 299
Pinard, 218
Pinel, 339, 345
Pirogoff, 371
Pirrie, 299
Plater, 414
Plenck, 538
Pliny, 324
Ploucquet, 418
Podrazki, 106, 140
Poinsot, 83, 140
Polaillon, 218
Porro, 218
Portal, 51, 476
Porter, 317, 360
Postel, 518
Pott, 392
Power, 214
Pozzi, 531
Pressat, 462, 469
Prévost, 462, 469
Primus, 367
Prince, 454
Prout, 446
Puech, 344
Purton, 114, 116
Pye-Smith, 116
Quain, 1
Quelmalz, 431
Quincke, 230
Rabitsch, 536
Rampolla, 526
Rause, 17, 45
Ranvier, 46, 284, 290, 328, 364
Ratton, 507, 521, 531
Rayer, 284, 417
Raymond, 347
Raynaud, Maurice, 208, 464, 472
Razoux, 458
Reeder, 367
Reeves, 112, 115, 116
Reimer, 107
Reininger, 325, 329
Reinsch, 288
Renard, 140
Rendu, 387
Rhodius, 105, 345
Richard, 506
Richet, 140, 385, 389
Riedel, 108
Riedlinus, 414
Riesel, 116
Rilliet, 58, 61, 63
Rindfleisch, 87
Roberts, 300, 312
Robertson, 355, 471
Robin, 65
Robin-Massé, 506, 509, 526, 528
Robinson, Beverley, 267, 313, 322, 323, 326, 483, 488, 491
Rockwell, 471

Roe, 21, 136, 139, 300, 308, 362, 444
Roederer, 218
Roger, 425
Rogerius, 392
Rokitansky, 51, 87, 90, 92, 99, 114, 115, 127
Ronaldson, 477
Roosa, 260
Rose, 146
Rose, Cooper, 279
Rosenbach, 97
Rosenmüller, 469
Rosenthal, 212
Roser, 523
Rossi, 219, 428
Roth, 514
Rouge, 326, 522
Rouse, 507
Roux, 208, 506
Rouyer, 444
Rumbold, 258, 313, 314, 483
Ruysch, 105, 444
Ryan, 37
Sabatier, 377
St. Ange, 278
Sainte-Marie, Gaston, 13
Sajous, 323
Salisbury, 288
Sampson, 98
Sander, 472
Sandifort, 461
Sands, 507, 521
Santorini, 233
Sappey, 2, 100, 432
Saunders, 538
Savialles, 444
Sänger, 402
Schäffer, 326, 327, 333, 360, 382
Schilling, 417
Schilz, 136
Schlaeger, 472
Schmieder, 98
Schneider, 99, 284
Schnitzler, 242
Schöller, 218, 220
Schönborn, 146, 147
Schrötter, 238, 326
Schuster, 241, 397, 405
Schüller, Max, 413
Schütz, 422
Schwartze, 540
Sédillot, 83, 146, 205, 226, 521
Seiler, 289, 297, 320, 361, 435
Seitz, 70
Semeleder, 13, 246, 432, 494
Semon, 90, 341, 496
Seney, 211
Serres, 468
Seux, 65, 66, 67
Severinus, 105
Shaw, John, 210
Sigmund, 296
Simon, 186
Smith, Abbott, 299, 307
Smith, Andrew, 146, 211
Smith, Johnson, 342
Smith, Priestley, 316
Smith, R. W., 112
Smyly, Josiah, 349
Smyth, Carmichael, 161
Sommerbrodt, 159
Sonderland, 217
South, 296
Spencer, 360
Spengler, 116
Spies, 199
Spillman, 355, 387, 398, 399, 415, 445, 507, 517, 518, 523, 531
Spitta, 193
Squire, 70
Steenberg, 218
Steffen, 35, 66, 68, 70, 106
Stevenson, 208
Stoerk, 13, 15, 246, 250, 251, 276, 326, 327, 337, 359
Stoffel, 139
Stoker, Thornley, 536
Stoll, 284
Stricker, 464
Studsgaard, 136, 141, 146
Sue, 196
Sundewall, 218
Susruta, 397
Swiedaur, 538
Sydenham, 339, 352
Syme, 130, 392, 505
Symonds, Addington, 292
Taendler, 161
Tantuzzi, 414
Tardieu, 417
Tarenget, 139, 505
Tauber, 495
Tay, 146
Taylor, 40, 41
Temple, Sir William, 286
Tengmalm, 449
Tenon, 217
Terrier, 140, 141, 197
Theile, 432

Thomas. 476. 507
Thouret. 444
Thudichum. 237, 259, 355, 380. 391
Tiedemann. 448. 460
Tilanus. 218
Tillaux, 136, 332. 440
Tillot. 313. 326
Todd. 163. 360
Tonoli. 100
Tornwaldt, 408
Trallianus. Alexander, 325
Travers. 159. 417
Trelat. 22, 136, 533
Trendelenburg. 70. 146, 150
Troup. 146
Trousseau. 325. 400
Tulpe, 460
Turtle, 192
Türck. 246, 249
Ure. 385
Vacca-Berlinghieri, 142, 197, 511
Valleix. 65, 67
Valsalva. 346. 349. 371, 538
Van Cruyck, 218
Van der Wiel, 199, 205
Van Helmont, 207
Van Meekren, 356
Van Swieten, 26, 72, 77, 199, 347, 538
Van Thaden, 146
Vater, 99
Vauquelin. 284
Veillon, 536
Velpeau. 432, 437, 518
Verdue, 196
Verneuil, 146, 147, 384, 385, 393, 412, 441, 508, 517, 521, 536
Véron, 65
Viennois, 392
Vieussens, 325
Vimont. 99
Virchow, 106, 324, 417, 422, 511
Vogel, 41, 339
Voisin, 508
Volkmann, 397, 408
Voltolini, 236, 237, 238, 243, 245, 246, 248, 249, 250, 251, 360. 368, 371, 377, 380, 477, 494
Von Langenbeck, 186, 187, 195, 197
Von Tröltsch, 238, 540, 541, 543
Wagner, 69
Wagner, Clinton, 257, 358, 397
Waldenburg, 14, 124
Wales, 250
Walsham, 432, 437
Walshe, 72, 73, 191, 307
Walton, Haynes, 423
Ward, 218
Warner, 218
Waterman, 507
Watson, 139
Watson, Spencer, 239, 364, 391. 397
Watson. Sir Thomas, 64, 119. 347
Weber, 259
Weber, 449
Weber, Hermann, 295, 406
Weber, Otto, 325, 427, 429, 536
Weber-Liel, 238, 260, 539, 541
Wedel, 284
Weichselbaum, 408
Weigert, 102
Weinlechner, 411
Welcker, 432
Wendt, 461, 483, 539
Wepfer, 199. 444
Wernher, 159
Wertheim, 245
West, Charles, 70
West, of Birmingham, 106, 120. 428, 444
Westbrook, 218
Westphal, 473
Whately, 505, 509, 518
Whistler, 264
Whitehead, 507
Whytt, 473
Wilks, 106, 119, 121, 156, 160
Will, Ogilvie, 507
Willett, 140
Williams, C. J. B., 161, 292
William of Salicet, 354, 392
Willigk, 112, 218, 399, 408
Willis, 198, 205
Wilson, 200
Woakes, 274, 336, 483, 495, 496. 539
Wohlfahrt, 118, 159
Wolff, 130
Wolzendorf, 130, 134
Worthington, 114
Wrisberg, 159
Wyman, Morrill, 300, 306
Wyss, 100
Yearsley, 538
Zaufal, 238, 270, 326, 328. 331. 369, 503, 540
Zenker, 30, 37, 51, 62, 68. 72. 73.

75, 84, 85, 87, 102, 112, 114, 115, 116, 122, 123, 126, 127, 141, 156, 166, 167, 208
Ziem, 333
Ziemssen, 30, 37, 70, 72, 73, 75, 78, 85, 87, 88, 100, 102, 112, 114, 115, 122, 123, 126, 127, 166, 167, 229, 231
Ziesner, 59
Zuckerkandl, 233, 234, 333, 334, 355, 356, 358, 359, 364, 365, 378, 383, 432, 476, 479, 540

Pardon and Sons, Printers, Paternoster Lane, and Wine Office Court, London.

OPINIONS OF THE PRESS
ON THE
FIRST VOLUME
OF
THIS WORK.

"This is the first volume of a comprehensive work in which Dr. Mackenzie proposes to give a systematic account of the morbid conditions of the upper parts of the respiratory and alimentary passages—diseases to which he has long and successfully devoted himself as a specialist, and upon which he is decidedly recognized as a high authority. . . . . Within a comparatively small space, the author has compressed a vast store of information, which he has put together with much literary skill, and supplemented by exhaustive bibliographical references. The work is practical in tone throughout. We commend it as a thoroughly reliable text-book."—*British Medical Journal.*

"The work is the outcome of Dr. Mackenzie's unrivalled experience of the affections of which he treats, and it exhibits in every part—though as was to be expected, with some differences of more or less—the extensive research, clearness of description, close observation, completeness with conciseness of practical detail, and fulness of experience that Dr. Morell Mackenzie has accustomed us to expect in his writings."—*Medical Times and Gazette.*

"There is no appearance of any effort at "bookmaking," no insertion of records of cases which have not unusual or special interest; but the reader is taken systematically from the definition of the affection to its treatment. . . . . It would be impossible in a brief notice to give any sketch of the portion of the work devoted to laryngeal and tracheal affections. Full of new hints for diagnosis, and suggestions for treatment, we can only recommend it as a book of reference of real value, and we say advisedly, indispensable to all who use the laryngoscope."—*Medical Press and Circular.*

"We have spent a very pleasant and profitable time in reading this manual, and we sincerely hope that it may have a very wide circulation, and become, as we feel sure it is bound to do, the standard guide to the student and general practitioner."—*Birmingham Medical Review.*

"This work is most carefully got up, and is, in fact, a small encyclopædia upon the subject treated of, and well worthy of a place upon the medical man's book table. The illustrations are numerous and well executed." *Edinburgh Medical Journal.*

"For clear style and keen close analysis of the whole bearings of each department of the subject, this book must be allowed to stand in the highest rank of English contributions to medical science; while the extensive experience of the author, handled in his well-known candid and independent way, gives the greatest force to the conclusions arrived at."—*Glasgow Medical Journal.*

"All who wish to acquire a knowledge of modern laryngoscopy must study this treatise for themselves. It adds another to the list of standard works on special subjects which have of late years appeared from the hands of men who by enormous experience in these special branches, are particularly well fitted to assume the part of leaders and reliable teachers to their less favoured brethren. . . . . There can be but one verdict of the profession on this manual—it stands without any competitor in British medical literature as a standard work on the organs it professes to treat of."—*Dublin Journal of Medical Science.*

"Mackenzie's manual evinces more systematic labour in its preparation than any of the others on the list; and general acknowledgment is given in the preface for a certain amount of aid, without which it would have been practically impossible for a busy practitioner to prepare a volume so copious and accurate in its references, so exhaustive in its historic compilations. When we take into consideration the facility of the access of British and continental authors to the large medical and scientific libraries of the great literary centres of Europe, the wonder is that similar avail is not more frequently resorted to. Mackenzie's volume will remain valuable to all time for its historic interest alone. The published records of contemporaneous observers are frequently alluded to, more or less directly, in illustration of views accepted or criticized by the author, and incorporated with the collated statistics and vivid impressions of probably the most extensive personal experience in the profession on the subjects in hand, they are wrought into a lucid exposition of the present state of our knowledge of them."—*American Journal of the Medical Sciences.*

"For twenty years the reputation of Morell Mackenzie as practitioner, writer, and teacher in this department of medicine has been unrivalled. In truth, the history of his professional life, covering as it does the period of the inception, growth, and full development of modern laryngoscopy, would represent almost the history of that art; while his brilliant mental endowments, extraordinary clinical opportunities, and systematic methods of observation, render him better fitted to produce a work upon diseases of the throat than any specialist of his time. To say that his book exceeds our expectations is but half to express the satisfaction which it gives. Both from a scientific and from a literary standpoint it is in all essentials as nearly perfect as possible. From beginning to end, its clearness, accuracy, and conciseness are admirable, while the completeness with which every subject is considered causes us to wonder that so much could have been included within the limits maintained. The richness of the bibliography is remarkable, and full credit is given in all cases to authors quoted. Details of cases, excepting when such histories are particularly interesting or instructive, have been omitted. Dr. Mackenzie's work is classic, and as such it must support most amply his claim to the first position among laryngologists."—*New York Medical Journal.*

"This is in every sense a most admirable work, reflecting lasting credit upon its distinguished author. The labour which is so well attested in every page is truly surprising. All sources of information have been thoroughly sifted. Not only is the bibliographical research most praiseworthy in its extent: it is equally so in its exactness: to which is added the result of his own valuable experience."—*Archives of Laryngology.*

"The author treats his subject in a thorough and systematic manner, and his large experience and intimate acquaintance with the results of the labours of others are sufficient guarantee that the book is fully up with the times."—*Medical and Surgical Reporter.*

"An excellent book, as was expected from the long special experience and known literary skill of the author. The subjects are thoroughly, and at the same time concisely treated, and we think Dr. Mackenzie has succeeded admirably in crystallizing his experience into text-book limits."—*Boston Medical and Surgical Journal.*

"In the recent flood of literature of the throat the work of Mackenzie takes an exceptional place. Unlike most of the late effusions on laryngology, et cetera, this book owes its origin not alone to the author's desire for a reputation, but also to a real demand by the profession. It is intended as a complete text-book on the subject, and as such it has no peer in our language. It embraces fully the topics indicated in the title, presenting them in a practical and thorough manner, and with but few exceptions introduces all that is really known up to date."—*Chicago Medical Review.*

"It would be expected that the chapter upon laryngeal paralysis would be a masterpiece, for Dr. Mackenzie was the pioneer, as he is the authority, in this special study, and we are not disappointed. We commend it to the intelligent physician as embracing all thus far known upon the subject. . . . This work throughout is so condensed and complete that only a few of its features can be noticed. As a special treatise by a specialist, it is broad and unbiased; as a scholarly production it is remarkable for terseness, sound sense, and good English. If our many authors would only imitate Dr. Mackenzie's patience, care, and candour, and be as concise and unostentatious as he, we would have not so many books, but better ones, and fewer tired and disgusted readers. We thank him as much for the *way* he has written as for *what* he has written."—*St. Louis Clinical Record.*

"This work seems complete in every part, and coming from one of the best known specialists in England, the views advanced are worthy of the most attentive consideration."—*Peoria Medical Monthly.*

"No practitioner can afford to be indifferent to a publication of this character, which brings together and formulates for the first time the results of the exceptionally large experience of one of the most distinguished of English specialists."—*Philadelphia Dental Cosmos.*

"From this *résumé* of the contents it will readily be seen what a large field is covered by the treatise. It need only be added that it seems to be very complete in all its parts, the views held with reference both to diagnosis and treatment carrying with them the weighty authority of one of the most able and experienced specialists of Great Britain. The book is illustrated with a large number of woodcuts, and is gotten up in very good style."—*Canada Medical and Surgical Journal.*

"The book is one which may be read by the studious medical practitioner with much advantage."—*Canada Lancet.*

"We are pleased to say that the expectations we had formed of this book have not merely been realised in the fullest manner, but far exceeded. Although many of the author's scattered essays had already found their way to Germany, we have not till now had an opportunity of considering his views in their entirety. The publication of the present work has gratified a wish that has long been felt, and we hardly know which most to admire—the vast opportunities for observation which the author has enjoyed, or the thoroughness, diligence, and impartiality with which he has handled the voluminous literature of the subject."—*Deutsches Archiv für klinische Medicin.*

"When an author like Mackenzie undertakes to write a treatise on diseases of the throat and nose, our expectations are raised to the highest pitch, not only because he has been working throughout the twenty years in which the diseases of the pharynx and larynx have been studied in a really scientific manner, but also because from the circumstances of his position he has had opportunities for observation such as few others have enjoyed. Our hopes have been fully realized, for although only the first part of the work has yet appeared, we have already a handsome volume which owes its bulk neither to padding nor diffuseness, but to such a thorough handling of the subject as is not to be found in any other text-book. It is easy to see that the pictures of disease are drawn from a rich personal experience, whilst at the same time full use is made of the labours of others."—*Centralblatt für Chirurgie.*

"When the leading English laryngologist, as Morell Mackenzie must undoubtedly be allowed to be, publishes the results of his ripe experience and studies in a new work, high expectations are naturally excited. We are glad to say that so far from our hopes being disappointed they are in many respects greatly surpassed. The book is written in a spirit of the utmost thoroughness, and yet with careful consideration for the wants of the busy practitioner."—*Zeitschrift fur klinische Medicin.*

"The author of the present work on Diseases of the Throat and Nose, which has lately been published both in English and in German, is not unknown to our readers, as we have on several previous occasions expressed our appreciation of his writings. It is impossible to deny that Morell Mackenzie is one of the most distinguished writers on diseases of the larynx, as well as a skilful practitioner in that special line. To a clinical experience of quite exceptional range, he adds an unusually wide acquaintance with medical literature, and he has not only the power of giving clear and logical expression to his ideas, but the far rarer gift of being able ungrudgingly to do full justice to the labours of his fellow-workers."—*Wiener medizinische Presse.*

"The author has certainly put his whole medical life into this excellent treatise. No one has ever been in a better position for raising such a monument of the healing art. Connected with two important hospitals, and eagerly sought after in private practice, he has seen and made his own everything within the range of the specialty to which he has devoted himself. More, however, than mere experience was needed, viz., the power of observing facts, together with sagacity in analysing and classifying them, and acuteness in drawing fruitful instruction from them. To the faculty of observation Dr. Morell Mackenzie adds solid learning, and the capacity of dealing with his subject so as to omit nothing of any practical value. His book will live, and we are happy to recommend it to the members of our medical fraternity."—*Union Médicale.*

"The work is so complete that it would be impossible, without devoting an entire volume to the subject, to analyse its numerous chapters in detail. We need only tell the reader that Morell Mackenzie's book is a perfect mine of information."—*Gazette Médicale.*

"We had not previously a complete treatise on diseases of the larynx. Dr. Moure and our colleague, Dr. F. Bertier, have now supplied this want by their translation of Morell Mackenzie's important work."—*Lyon Médical.*

[CATALOGUE C]

LONDON, *May*, 1884.

J. & A. CHURCHILL'S

MEDICAL CLASS BOOKS.

ANATOMY.

BRAUNE.—An Atlas of Topographical Anatomy, after Plane Sections of Frozen Bodies. By WILHELM BRAUNE, Professor of Anatomy in the University of Leipzig. Translated by EDWARD BELLAMY, F.R.C.S., and Member of the Board of Examiners; Surgeon to Charing Cross Hospital, and Lecturer on Anatomy in its School. With 34 Photo-lithographic Plates and 46 Woodcuts. Large Imp. 8vo, 40s.

FLOWER.—Diagrams of the Nerves of the Human Body, exhibiting their Origin, Divisions, and Connexions, with their Distribution to the various Regions of the Cutaneous Surface, and to all the Muscles. By WILLIAM H. FLOWER, F.R.C.S., F.R.S. Third Edition, containing 6 Plates. Royal 4to, 12s.

GODLEE.—An Atlas of Human Anatomy: illustrating most of the ordinary Dissections and many not usually practised by the Student. By RICKMAN J. GODLEE, M.S., F.R.C S., Assistant-Surgeon to University College Hospital, and Senior Demonstrator of Anatomy in University College. With 48 Imp. 4to Coloured Plates, containing 112 Figures, and a Volume of Explanatory Text, with many Engravings. 8vo, £4 14s. 6d.

HEATH.—Practical Anatomy: a Manual of Dissections. By CHRISTOPHER HEATH, F.R.C.S., Holme Professor of Clinical Surgery in University College and Surgeon to the Hospital. Fifth Edition. With 24 Coloured Plates and 269 Engravings. Crown 8vo, 15s.

ANATOMY—*continued.*

HOLDEN.—A Manual of the Dissection of the Human Body. By LUTHER HOLDEN, F.R.C.S., Consulting-Surgeon to St. Bartholomew's Hospital. Fifth Edition, by JOHN LANGTON, F.R.C.S., Surgeon to, and Lecturer on Anatomy at, St. Bartholomew's Hospital. With Engravings. 8vo. [*In preparation.*

By the same Author.

Human Osteology: comprising a Description of the Bones, with Delineations of the Attachments of the Muscles, the General and Microscopical Structure of Bone and its Development. Sixth Edition, revised by the Author and JAMES SHUTER, F.R.C.S., late Assistant-Surgeon to St. Bartholomew's Hospital. With 61 Lithographic Plates and 59 Engravings. Royal 8vo, 16s.

ALSO,

Landmarks, Medical and Surgical. Third Edition. 8vo, 3s. 6d.

MORRIS.—The Anatomy of the Joints of Man. By HENRY MORRIS, M.A., F.R.C.S., Surgeon to, and Lecturer on Anatomy and Practical Surgery at, the Middlesex Hospital. With 44 Plates (19 Coloured) and Engravings. 8vo, 16s.

The Anatomical Remembrancer; or, Complete Pocket Anatomist. Eighth Edition. 32mo, 3s. 6d.

WAGSTAFFE.—The Student's Guide to Human Osteology. By WM. WARWICK WAGSTAFFE, F.R.C.S., late Assistant-Surgeon to, and Lecturer on Anatomy at, St. Thomas's Hospital. With 23 Plates and 66 Engravings. Fcap. 8vo, 10s. 6d.

WILSON — BUCHANAN — CLARK. — Wilson's Anatomist's Vade-Mecum: a System of Human Anatomy. Tenth Edition, by GEORGE BUCHANAN, Professor of Clinical Surgery in the University of Glasgow, and HENRY E. CLARK, M.R.C.S., Lecturer on Anatomy in the Glasgow Royal Infirmary School of Medicine. With 450 Engravings, including 26 Coloured Plates. Crown 8vo, 18s.

BOTANY.

BENTLEY.—A Manual of Botany. By Robert Bentley, F.L.S., M.R.C.S., Professor of Botany in King's College and to the Pharmaceutical Society. With 1185 Engravings. Fourth Edition. Crown 8vo, 15s.

By the same Author.

The Student's Guide to Structural, Morphological, and Physiological Botany. With 660 Engravings. Fcap. 8vo, 7s. 6d.

ALSO,

The Student's Guide to Systematic Botany, including the Classification of Plants and Descriptive Botany. With 357 Engravings. Fcap. 8vo, 3s. 6d.

BENTLEY AND TRIMEN.—Medicinal Plants: being descriptions, with original Figures, of the Principal Plants employed in Medicine, and an account of their Properties and Uses. By Robert Bentley, F.L.S., and Henry Trimen, M.B., F.L.S. In 4 Vols., large 8vo, with 306 Coloured Plates, bound in half morocco, gilt edges, £11 11s.

CHEMISTRY.

BERNAYS.—Notes for Students in Chemistry; being a Syllabus of Chemistry compiled mainly from the Manuals of Fownes-Watts, Miller, Wurz, and Schorlemmer. By Albert J. Bernays, Ph.D., Professor of Chemistry at St. Thomas's Hospital. Sixth Edition. Fcap. 8vo, 3s. 6d.

By the same Author.

Skeleton Notes on Analytical Chemistry, for Students in Medicine. Fcap. 8vo, 2s. 6d.

BLOXAM.—Chemistry, Inorganic and Organic; with Experiments. By Charles L. Bloxam, Professor of Chemistry in King's College. Fifth Edition. With 292 Engravings. 8vo, 16s.

By the same Author.

Laboratory Teaching; or, Progressive Exercises in Practical Chemistry. Fourth Edition. With 83 Engravings. Crown 8vo, 5s. 6d.

CHEMISTRY—*continued.*

BOWMAN AND BLOXAM.—Practical Chemistry, including Analysis. By JOHN E. BOWMAN, formerly Professor of Practical Chemistry in King's College, and CHARLES L. BLOXAM, Professor of Chemistry in King's College. With 98 Engravings. Seventh Edition. Fcap. 8vo, 6s. 6d.

BROWN. — Practical Chemistry: Analytical Tables and Exercises for Students. By J. CAMPBELL BROWN, D.Sc. Lond., Professor of Chemistry in University College, Liverpool. Second Edition. 8vo, 2s. 6d.

CLOWES.—Practical Chemistry and Qualitative Inorganic Analysis. An Elementary Treatise, specially adapted for use in the Laboratories of Schools and Colleges, and by Beginners. By FRANK CLOWES, D.Sc., Professor of Chemistry in University College, Nottingham. Third Edition. With 47 Engravings. Post 8vo, 7s. 6d.

FOWNES.—Manual of Chemistry.—*See WATTS.*

LUFF.—An Introduction to the Study of Chemistry. Specially designed for Medical and Pharmaceutical Students. By A. P. LUFF, F.I.C., F.C.S., Lecturer on Chemistry in the Central School of Chemistry and Pharmacy. Crown 8vo, 2s. 6d.

TIDY.—A Handbook of Modern Chemistry, Inorganic and Organic. By C. MEYMOTT TIDY, M.B., Professor of Chemistry and Medical Jurisprudence at the London Hospital. 8vo, 16s.

VACHER.—A Primer of Chemistry, including Analysis. By ARTHUR VACHER. 18mo, 1s.

VALENTIN.—Chemical Tables for the Lecture-room and Laboratory. By WILLIAM G. VALENTIN, F.C.S. In Five large Sheets, 5s. 6d.

CHEMISTRY—*continued.*

VALENTIN AND HODGKINSON.—A Course of Qualitative Chemical Analysis. By W. G. VALENTIN, F.C.S. Fifth Edition by W. R. HODGKINSON, Ph.D. (Wurzburg), Demonstrator of Practical Chemistry in the Science Training Schools. With Engravings. 8vo, 7s. 6d.

WATTS.—Physical and Inorganic Chemistry. By HENRY WATTS, B.A., F.R.S. (being Vol. I. of the Thirteenth Edition of Fownes' Manual of Chemistry). With 150 Wood Engravings, and Coloured Plate of Spectra. Crown 8vo, 9s.

By the same Author.

Chemistry of Carbon-Compounds, or Organic Chemistry (being Vol. II. of the Twelfth Edition of Fownes' Manual of Chemistry). With Engravings. Crown 8vo, 10s.

CHILDREN, DISEASES OF.

DAY.—A Treatise on the Diseases of Children. For Practitioners and Students. By WILLIAM H. DAY, M.D., Physician to the Samaritan Hospital for Women and Children. Crown 8vo, 12s. 6d.

ELLIS.—A Practical Manual of the Diseases of Children. By EDWARD ELLIS, M.D., late Senior Physician to the Victoria Hospital for Sick Children. With a Formulary. Fourth Edition. Crown 8vo, 10s.

SMITH.—On the Wasting Diseases of Infants and Children. By EUSTACE SMITH, M.D., F.R.C.P., Physician to H.M. the King of the Belgians, and to the East London Hospital for Children. Fourth Edition. Post 8vo, 8s. 6d.

By the same Author.

Clinical Studies of Disease in Children. Second Edition. Post 8vo. [*In preparation.*

STEINER.—Compendium of Children's Diseases; a Handbook for Practitioners and Students. By JOHANN STEINER, M.D. Translated by LAWSON TAIT, F.R.C.S., Surgeon to the Birmingham Hospital for Women, &c. 8vo, 12s. 6d.

DENTISTRY.

GORGAS.—**Dental Medicine: a Manual of** Dental Materia Medica and Therapeutics, for Practitioners and Students. By Ferdinand J. S. Gorgas, A.M., M.D., D.D.S., Professor of Dentistry in the University of Maryland; Editor of "Harris's Principles and Practice of Dentistry," &c. Royal 8vo, 14s.

SEWILL.—**The Student's Guide to Dental** Anatomy and Surgery. By Henry E. Sewill, M.R.C.S., L.D.S., late Dental Surgeon to the West London Hospital. Second Edition. With 78 Engravings. Fcap. 8vo, 5s. 6d.

STOCKEN.—**Elements of Dental Materia Medica** and Therapeutics, with Pharmacopœia. By James Stocken, L.D.S.R.C.S., late Lecturer on Dental Materia Medica and Therapeutics and Dental Surgeon to the National Dental Hospital: assisted by Thomas Gaddes, L.D.S. Eng. and Edin. Third Edition. Fcap. 8vo, 7s. 6d.

TAFT.—**A Practical Treatise on Operative** Dentistry. By Jonathan Taft, D.D.S., Professor of Operative Surgery in the Ohio College of Dental Surgery. Third Edition. With 134 Engravings. 8vo, 18s.

TOMES (C. S.).—**Manual of Dental Anatomy,** Human and Comparative. By Charles S. Tomes, M.A., F.R.S. Second Edition. With 191 Engravings. Crown 8vo, 12s. 6d.

TOMES (J. and C. S.).—**A Manual of Dental** Surgery. By John Tomes, M.R.C.S., F.R.S., and Charles S. Tomes, M.A., M.R.C.S., F.R.S.; Lecturer on Anatomy and Physiology at the Dental Hospital of London. Third Edition. With many Engravings. Crown 8vo. [*In the press.*

EAR, DISEASES OF.

BURNETT.—**The Ear: its Anatomy, Physiology,** and Diseases. A Practical Treatise for the Use of Medical Students and Practitioners. By Charles H. Burnett, M.D., Aural Surgeon to the Presbyterian Hospital, Philadelphia. With 87 Engravings. 8vo, 18s.

DALBY.—**On Diseases and Injuries of the Ear.** By William B. Dalby, F.R.C.S., Aural Surgeon to, and Lecturer on Aural Surgery at, St. George's Hospital. Second Edition. With Engravings. Fcap. 8vo, 6s. 6d.

EAR, DISEASES OF—*continued.*

JONES.—**A Practical Treatise on Aural Surgery.** By H. MACNAUGHTON JONES, M.D., Professor of the Queen's University in Ireland, late Surgeon to the Cork Ophthalmic and Aural Hospital. Second Edition. With 63 Engravings. Crown 8vo, 8s. 6d.

By the same Author.

Atlas of the Diseases of the Membrana Tympani. In Coloured Plates, containing 59 Figures. With Explanatory Text. Crown 4to, 21s.

FORENSIC MEDICINE.

OGSTON.—**Lectures on Medical Jurisprudence.** By FRANCIS OGSTON, M.D., late Professor of Medical Jurisprudence and Medical Logic in the University of Aberdeen. Edited by FRANCIS OGSTON, Jun., M.D., late Lecturer on Practical Toxicology in the University of Aberdeen. With 12 Plates. 8vo, 18s.

TAYLOR.—**The Principles and Practice of Medical Jurisprudence.** By ALFRED S. TAYLOR, M.D., F.R.S. Third Edition, revised by THOMAS STEVENSON, M.D., F.R.C.P., Lecturer on Chemistry and Medical Jurisprudence at Guy's Hospital; Examiner in Chemistry at the Royal College of Physicians; Official Analyst to the Home Office. With 188 Engravings. 2 Vols. 8vo, 31s. 6d.

By the same Author.

A Manual of Medical Jurisprudence. Tenth Edition. With 55 Engravings. Crown 8vo, 14s.

ALSO,

On Poisons, in relation to Medical Jurisprudence and Medicine. Third Edition. With 104 Engravings. Crown 8vo, 16s.

TIDY AND WOODMAN.—**A Handy-Book of Forensic Medicine and Toxicology.** By C. MEYMOTT TIDY, M.B.; and W. BATHURST WOODMAN, M.D., F.R.C.P. With 8 Lithographic Plates and 116 Wood Engravings. 8vo, 31s. 6d.

HYGIENE.

PARKES.—A Manual of Practical Hygiene. By EDMUND A. PARKES, M.D., F.R.S. Sixth Edition by F. DE CHAUMONT, M.D., F.R.S., Professor of Military Hygiene in the Army Medical School. With 9 Plates and 103 Engravings. 8vo, 18s.

WILSON.—A Handbook of Hygiene and Sanitary Science. By GEORGE WILSON, M.A., M.D., F.R.S.E., Medical Officer of Health for Mid Warwickshire. Fifth Edition. With Engravings. Crown 8vo, 10s. 6d.

MATERIA MEDICA AND THERAPEUTICS.

BINZ AND SPARKS.—The Elements of Therapeutics; a Clinical Guide to the Action of Medicines. By C. BINZ, M.D., Professor of Pharmacology in the University of Bonn. Translated and Edited with Additions, in conformity with the British and American Pharmacopœias, by EDWARD I. SPARKS, M.A., M.B., F.R.C.P. Lond. Crown 8vo, 8s. 6d.

OWEN.—A Manual of Materia Medica; incorporating the Author's "Tables of Materia Medica." By ISAMBARD OWEN, M.D., Lecturer on Materia Medica and Therapeutics to St. George's Hospital. Crown 8vo, 6s.

ROYLE AND HARLEY.—A Manual of Materia Medica and Therapeutics. By J. FORBES ROYLE, M.D., F.R.S., and JOHN HARLEY, M.D., F.R.C.P., Physician to, and Joint Lecturer on Clinical Medicine at, St. Thomas's Hospital. Sixth Edition. With 139 Engravings. Crown 8vo, 15s.

THOROWGOOD.—The Student's Guide to Materia Medica and Therapeutics. By JOHN C. THOROWGOOD, M.D., F.R.C.P., Lecturer on Materia Medica at the Middlesex Hospital. Second Edition. With Engravings. Fcap. 8vo, 7s.

WARING.—A Manual of Practical Therapeutics. By EDWARD J. WARING, C.I.E., M.D., F.R.C.P. Third Edition. Fcap. 8vo, 12s. 6d.

MEDICINE.

BARCLAY.—A Manual of Medical Diagnosis. By A. WHYTE BARCLAY, M.D., F.R.C.P., late Physician to, and Lecturer on Medicine at, St. George's Hospital. Third Edition. Fcap. 8vo, 10s. 6d.

CHARTERIS.—The Student's Guide to the Practice of Medicine. By MATTHEW CHARTERIS, M.D., Professor of Materia Medica, University of Glasgow; Physician to the Royal Infirmary. With Engravings on Copper and Wood. Third Edition. Fcap. 8vo, 7s.

FENWICK.—The Student's Guide to Medical Diagnosis. By SAMUEL FENWICK, M.D., F.R.C.P., Physician to the London Hospital. Fifth Edition. With 111 Engravings. Fcap. 8vo, 7s.

By the same Author.

The Student's Outlines of Medical Treatment. Second Edition. Fcap. 8vo, 7s.

FLINT.—Clinical Medicine: a Systematic Treatise on the Diagnosis and Treatment of Disease. By AUSTIN FLINT, M.D., Professor of the Principles and Practice of Medicine, &c., in Bellevue Hospital Medical College. 8vo, 20s.

HALL.—Synopsis of the Diseases of the Larynx, Lungs, and Heart: comprising Dr. Edwards' Tables on the Examination of the Chest. With Alterations and Additions. By F. DE HAVILLAND HALL, M.D., F.R.C.P., Assistant-Physician to the Westminster Hospital. Royal 8vo, 2s. 6d.

SANSOM.—Manual of the Physical Diagnosis of Diseases of the Heart, including the use of the Sphygmograph and Cardiograph. By A. E. SANSOM, M.D., F.R.C.P., Assistant-Physician to the London Hospital. Third Edition. With 47 Woodcuts. Fcap. 8vo, 7s. 6d.

WARNER.—Student's Guide to Medical Case-Taking. By FRANCIS WARNER, M.D., F.R.C.P., Assistant-Physician to the London Hospital. Fcap. 8vo, 5s.

WEST.—How to Examine the Chest: being a Practical Guide for the Use of Students. By SAMUEL WEST, M.D., M.R.C.P., Physician to the City of London Hospital for Diseases of the Chest, &c. With 42 Engravings. Fcap. 8vo, 5s.

MEDICINE—*continued.*

WHITTAKER.—**Student's Primer on the Urine.** By J. TRAVIS WHITTAKER, M.D., Clinical Demonstrator at the Royal Infirmary, Glasgow. With Illustrations, and 16 Plates etched on Copper. Post 8vo, 4s. 6d.

MIDWIFERY.

BARNES.—**Lectures on Obstetric Operations,** including the Treatment of Hæmorrhage, and forming a Guide to the Management of Difficult Labour. By ROBERT BARNES, M.D., F.R.C.P., Obstetric Physician to, and Lecturer on Diseases of Women, &c., at, St. George's Hospital. Third Edition. With 124 Engravings. 8vo, 18s.

CLAY.—**The Complete Handbook of Obstetric** Surgery; or, Short Rules of Practice in every Emergency, from the Simplest to the most formidable Operations connected with the Science of Obstetricy. By CHARLES CLAY, M.D., late Senior Surgeon to, and Lecturer on Midwifery at, St. Mary's Hospital, Manchester. Third Edition. With 91 Engravings. Fcap. 8vo, 6s. 6d.

RAMSBOTHAM.—**The Principles and Practice** of Obstetric Medicine and Surgery. By FRANCIS H. RAMSBOTHAM, M.D., formerly Obstetric Physician to the London Hospital. Fifth Edition. With 120 Plates, forming one thick handsome volume. 8vo, 22s.

REYNOLDS. — **Notes on Midwifery: specially** designed to assist the Student in preparing for Examination. By J. J. REYNOLDS, L.R.C.P., M.R.C.S. Fcap. 8vo, 4s.

ROBERTS.—**The Student's Guide to the Practice** of Midwifery. By D. LLOYD ROBERTS, M.D., F.R.C.P., Physician to St. Mary's Hospital, Manchester. Third Edition. With 2 Coloured Plates and 127 Engravings. Fcap. 8vo, 7s. 6d.

SCHROEDER.—**A Manual of Midwifery; including** the Pathology of Pregnancy and the Puerperal State. By KARL SCHROEDER, M.D., Professor of Midwifery in the University of Erlangen. Translated by CHARLES H. CARTER, M.D. With Engravings. 8vo, 12s. 6d.

SWAYNE.—**Obstetric Aphorisms for the Use of** Students commencing Midwifery Practice. By JOSEPH G. SWAYNE, M.D., Lecturer on Midwifery at the Bristol School of Medicine. Seventh Edition. With Engravings. Fcap. 8vo, 3s. 6d.

MICROSCOPY.

CARPENTER.—**The Microscope and its Revelations.** By WILLIAM B. CARPENTER, C.B., M.D., F.R.S. Sixth Edition. With 26 Plates, a Coloured Frontispiece, and more than 500 Engravings. Crown 8vo, 16s.

MARSH. — **Microscopical Section-Cutting: a** Practical Guide to the Preparation and Mounting of Sections for the Microscope, special prominence being given to the subject of Animal Sections. By Dr. SYLVESTER MARSH. Second Edition. With 17 Engravings. Fcap. 8vo, 3s. 6d.

MARTIN.—**A Manual of Microscopic Mounting.** By JOHN H. MARTIN, Member of the Society of Public Analysis, &c. Second Edition. With several Plates and 144 Engravings. 8vo, 7s. 6d.

OPHTHALMOLOGY.

HIGGENS.—**Hints on Ophthalmic Out-Patient** Practice. By CHARLES HIGGENS, F.R.C.S., Ophthalmic Surgeon to, and Lecturer on Ophthalmology at, Guy's Hospital. Second Edition. Fcap. 8vo, 3s.

JONES.—**A Manual of the Principles and** Practice of Ophthalmic Medicine and Surgery. By T. WHARTON JONES, F.R.C.S., F.R.S., late Ophthalmic Surgeon and Professor of Ophthalmology to University College Hospital. Third Edition. With 9 Coloured Plates and 173 Engravings. Fcap. 8vo, 12s. 6d.

NETTLESHIP.—**The Student's Guide to Diseases** of the Eye. By EDWARD NETTLESHIP, F.R.C.S., Ophthalmic Surgeon to, and Lecturer on Ophthalmic Surgery at, St. Thomas's Hospital. Third Edition. With 157 Engravings, and a Set of Coloured Papers illustrating Colour-blindness. Fcap. 8vo, 7s. 6d.

WOLFE.—**On Diseases and Injuries of the Eye:** a Course of Systematic and Clinical Lectures to Students and Medical Practitioners. By J. R. WOLFE, M.D., F.R.C.S.E., Senior Surgeon to the Glasgow Ophthalmic Institution; Lecturer on Ophthalmic Medicine and Surgery in Anderson's College. With 10 Coloured Plates, and 120 Wood Engravings, 8vo, 21s.

PATHOLOGY.

JONES AND SIEVEKING.—A Manual of Pathological Anatomy. By C. HANDFIELD JONES, M.B., F.R.S., and EDWARD H. SIEVEKING, M.D., F.R.C.P. Second Edition. Edited, with considerable enlargement, by J. F. PAYNE, M.B., Assistant-Physician and Lecturer on General Pathology at St. Thomas's Hospital. With 195 Engravings. Crown 8vo, 16s.

LANCEREAUX.—Atlas of Pathological Anatomy. By Dr. LANCERAUX. Translated by W. S. GREENFIELD, M.D., Professor of Pathology in the University of Edinburgh. With 70 Coloured Plates. Imperial 8vo, £5 5s.

VIRCHOW.—Post-Mortem Examinations: a Description and Explanation of the Method of Performing them, with especial reference to Medico-Legal Practice. By Professor RUDOLPH VIRCHOW, Berlin Charité Hospital. Translated by Dr. T. B. SMITH. Second Edition, with 4 Plates. Fcap. 8vo, 3s. 6d.

WILKS AND MOXON.—Lectures on Pathological Anatomy. By SAMUEL WILKS, M.D., F.R.S., Physician to, and late Lecturer on Medicine at, Guy's Hospital; and WALTER MOXON, M.D., F.R.C.P., Physician to, and Lecturer on the Practice of Medicine at, Guy's Hospital. Second Edition. With 7 Steel Plates. 8vo, 18s.

PSYCHOLOGY.

BUCKNILL AND TUKE.—A Manual of Psychological Medicine: containing the Lunacy Laws, Nosology, Ætiology, Statistics, Description, Diagnosis, Pathology, and Treatment of Insanity, with an Appendix of Cases. By JOHN C. BUCKNILL, M.D., F.R.S., and D. HACK TUKE, M.D., F.R.C.P. Fourth Edition, with 12 Plates (30 Figures). 8vo, 25s.

CLOUSTON.—Clinical Lectures on Mental Diseases. By THOMAS S. CLOUSTON, M.D., and F.R.C.P. Edin.: Lecturer on Mental Diseases in the University of Edinburgh. With 8 Plates (6 Coloured). Crown 8vo, 12s. 6d.

MANN.—A Manual of Psychological Medicine and Allied Nervous Disorders. By EDWARD C. MANN, M.D., Member of the New York Medico-Legal Society. With Plates. 8vo, 24s.

PHYSIOLOGY.

CARPENTER.—Principles of Human Physiology. By William B. Carpenter, C.B., M.D., F.R.S. Ninth Edition. Edited by Henry Power, M.B., F.R.C.S. with 3 Steel Plates and 377 Wood Engravings. 8vo, 31s. 6d.

DALTON.—A Treatise on Human Physiology: designed for the use of Students and Practitioners of Medicine. By John C. Dalton, M.D., Professor of Physiology and Hygiene in the College of Physicians and Surgeons, New York. Seventh Edition. With 252 Engravings. Royal 8vo, 20s.

FREY.—The Histology and Histo-Chemistry of Man. A Treatise on the Elements of Composition and Structure of the Human Body. By Heinrich Frey, Professor of Medicine in Zurich. Translated by Arthur E. Barker, Assistant-Surgeon to the University College Hospital. With 608 Engravings. 8vo, 21s.

SANDERSON.—Handbook for the Physiological Laboratory: containing an Exposition of the fundamental facts of the Science, with explicit Directions for their demonstration. By J. Burdon Sanderson, M.D., F.R.S.; E. Klein, M.D., F.R.S.; Michael Foster, M.D., F.R.S.; and T. Lauder Brunton, M.D., F.R.S. 2 Vols. with 123 Plates. 8vo, 24s.

YEO.—A Manual of Physiology for the Use of Junior Students of Medicine. By Gerald F. Yeo, M.D., F.R.C.S., Professor of Physiology in King's College, London. With 301 Engravings. Crown 8vo, 14s.

SURGERY.

BELLAMY.—The Student's Guide to Surgical Anatomy; a Description of the more important Surgical Regions of the Human Body, and an Introduction to Operative Surgery. By Edward Bellamy, F.R.C.S., and Member of the Board of Examiners; Surgeon to, and Lecturer on Anatomy at, Charing Cross Hospital. Second Edition. With 76 Engravings. Fcap. 8vo, 7s.

BRYANT.—A Manual for the Practice of Surgery. By Thomas Bryant, F.R.C.S., Surgeon to, and Lecturer on Surgery at, Guy's Hospital. Fourth Edition. With about 700 Engravings (nearly all original, many being coloured). 2 Vols. Crown 8vo. [*In the press.*

SURGERY—*continued.*

CLARK AND WAGSTAFFE. — Outlines of Surgery and Surgical Pathology. By F. LE GROS CLARK, F.R.C.S., F.R.S., Consulting Surgeon to St. Thomas's Hospital. Second Edition. Revised and expanded by the Author, assisted by W. W. WAGSTAFFE, F.R.C.S., Assistant Surgeon to St. Thomas's Hospital. 8vo, 10s. 6d.

DRUITT. —The Surgeon's Vade-Mecum; a Manual of Modern Surgery. By ROBERT DRUITT, F.R.C.S. Eleventh Edition. With 369 Engravings. Fcap. 8vo, 14s.

FERGUSSON.—A System of Practical Surgery. By Sir WILLIAM FERGUSSON, Bart., F.R.C.S., F.R.S., late Surgeon and Professor of Clinical Surgery to King's College Hospital. With 463 Engravings. Fifth Edition. 8vo, 21s.

HEATH.—A Manual of Minor Surgery and Bandaging, for the use of House-Surgeons, Dressers, and Junior Practitioners. By CHRISTOPHER HEATH, F.R.C.S., Holme Professor of Clinical Surgery in University College and Surgeon to the Hospital. Seventh Edition. With 129 Engravings. Fcap. 8vo, 6s.

By the same Author.

A Course of Operative Surgery: with Twenty Plates drawn from Nature by M. LEVEILLÉ, and Coloured. Second Edition. Large 8vo, 30s.

ALSO,

The Student's Guide to Surgical Diagnosis. Second Edition. Fcap. 8vo, 6s. 6d.

MAUNDER.—Operative Surgery. By Charles F. MAUNDER, F.R.C.S., late Surgeon to, and Lecturer on Surgery at, the London Hospital. Second Edition. With 164 Engravings. Post 8vo, 6s.

PIRRIE. — The Principles and Practice of Surgery. By WILLIAM PIRRIE, F.R.S.E., late Professor of Surgery in the University of Aberdeen. Third Edition. With 490 Engravings. 8vo, 28s.

SURGERY—*continued.*

SOUTHAM.—Regional Surgery: including Surgical Diagnosis. A Manual for the use of Students. By FREDERICK A. SOUTHAM, M.A., M.B. Oxon, F.R.C.S., Assistant-Surgeon to the Royal Infirmary, and Assistant-Lecturer on Surgery in the Owen's College School of Medicine, Manchester.

Part I. The Head and Neck. Crown 8vo, 6s. 6d.
,, II. The Upper Extremity and Thorax. Crown 8vo, 7s. 6d.

TERMINOLOGY.

DUNGLISON.—Medical Lexicon: a Dictionary of Medical Science, containing a concise Explanation of its various Subjects and Terms, with Accentuation, Etymology, Synonyms, &c. By ROBERT DUNGLISON, M.D. New Edition, thoroughly revised by RICHARD J. DUNGLISON, M.D. Royal 8vo, 28s.

MAYNE.—A Medical Vocabulary: being an Explanation of all Terms and Phrases used in the various Departments of Medical Science and Practice, giving their Derivation, Meaning, Application, and Pronunciation. By ROBERT G. MAYNE, M.D., LL.D., and JOHN MAYNE, M.D., L.R.C.S.E. Fifth Edition. Crown 8vo, 10s. 6d.

WOMEN, DISEASES OF.

BARNES.—A Clinical History of the Medical and Surgical Diseases of Women. By ROBERT BARNES, M.D., F.R.C.P., Obstetric Physician to, and Lecturer on Diseases of Women, &c., at, St. George's Hospital. Second Edition. With 181 Engravings. 8vo, 28s.

COURTY.—Practical Treatise on Diseases of the Uterus, Ovaries, and Fallopian Tubes. By Professor COURTY, Montpellier. Translated from the Third Edition by his Pupil, AGNES M'LAREN, M.D., M.K.Q.C.P. With Preface by Dr. MATTHEWS DUNCAN. With 424 Engravings. 8vo, 24s.

DUNCAN.—Clinical Lectures on the Diseases of Women. By J. MATTHEWS DUNCAN, M.D., F.R.C.P., F.R.S.E., Obstetric Physician to St. Bartholomew's Hospital. Second Edition, with Appendices. 8vo, 14s.

EMMET.—The Principles and Practice of Gynæcology. By THOMAS ADDIS EMMET, M.D., Surgeon to the Woman's Hospital of the State of New York. With 130 Engravings. Royal 8vo, 24s.

WOMEN, DISEASES OF—*continued.*

GALABIN.—The Student's Guide to the Diseases of Women. By ALFRED L. GALABIN, M.D., F.R.C.P., Obstetric Physician to, and Lecturer on Obstetric Medicine at, Guy's Hospital. Third Edition. With 78 Engravings. Fcap. 8vo, 7s. 6d.

REYNOLDS.—Notes on Diseases of Women. Specially designed to assist the Student in preparing for Examination. By J. J. REYNOLDS, L.R.C.P., M.R.C.S. Second Edition. Fcap. 8vo. 2s. 6d.

SMITH.—Practical Gynæcology: a Handbook of the Diseases of Women. By HEYWOOD SMITH, M.D., Physician to the Hospital for Women and to the British Lying-in Hospital. With Engravings. Second Edition. Crown 8vo. [*In preparation.*

WEST AND DUNCAN.—Lectures on the Diseases of Women. By CHARLES WEST, M.D., F.R.C.P. Fourth Edition. Revised and in part re-written by the Author, with numerous additions by J. MATTHEWS DUNCAN, M.D., F.R.C.P., F.R.S.E., Obstetric Physician to St. Bartholomew's Hospital. 8vo, 16s.

ZOOLOGY.

CHAUVEAU AND FLEMING.—The Comparative Anatomy of the Domesticated Animals. By A. CHAUVEAU Professor at the Lyons Veterinary School; and GEORGE FLEMING Veterinary Surgeon, Royal Engineers. With 450 Engravings. 8vo. 31s. 6d.

HUXLEY.—Manual of the Anatomy of Invertebrated Animals. By THOMAS H. HUXLEY. LL.D., F.R.S. With 156 Engravings. Post 8vo, 16s.

By the same Author.

Manual of the Anatomy of Vertebrated Animals. With 110 Engravings. Post 8vo, 12s.

WILSON.—The Student's Guide to Zoology: a Manual of the Principles of Zoological Science. By ANDREW WILSON, Lecturer on Natural History, Edinburgh. With Engravings. Fcap. 8vo, 6s. 6d.